

ANNUAL SANITARY REPORT

OF THE

PROVINCE OF ASSAM

FOR THE YEAR

1918.

BY

MAJOR T. C. McCOMBIE YOUNG, M.D., D.P.H., I.M.S.,

SANITARY COMMISSIONER, ASSAM.



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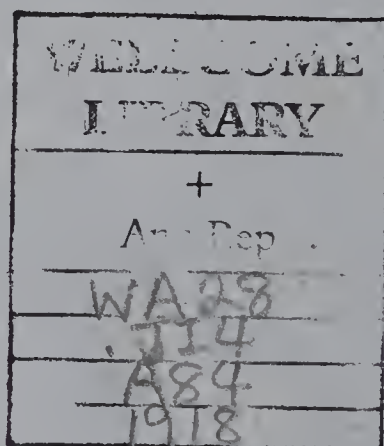
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FROM

MAJOR T. C. McCOMBIE YOUNG, M.D., D.P.H., I.M.S.,

SANITARY COMMISSIONER, ASSAM,

TO

THE SECOND SECRETARY TO THE CHIEF COMMISSIONER
OF ASSAM.

Shillong, the 12th May 1919.

SIR,

I HAVE the honour to submit herewith the Annual Sanitary Report of the province of Assam for the year 1918.

I have the honour to be,

SIR,

Your most obedient Servant,

T. C. McCOMBIE YOUNG, *Major, I.M.S.,*

Sanitary Commissioner, Assam.

Enclosures :—

1 Report.

13 Statements.

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ANNUAL SANITARY REPORT

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FOR THE YEAR

1918.

SECTION I.

METEOROLOGY.

The following note furnished by the Director General of Observatories describes the meteorological conditions of the province during the year 1918 :—

" The cold weather period, January and February.—Rainfall in the plains was in defect by 79 per cent. in January and 56 per cent. in February. There was somewhat less cloud than usual, but humidity and temperature were sensibly normal.

The hot weather period, March to May.—Rainfall in the plains exceeded the normal by 46 per cent. in March, but was deficient in April and May by 36 and 12 per cent., respectively. Skies were clouded to much less than the customary extent in April and May, and in the latter month temperature was 2° above the average. Humidity did not depart appreciably from the normal.

The South-West monsoon period, June to September.—The monsoon was more active than usual, and rainfall was above normal in all the four months ; the excess was greatest (45 per cent.) in July, and least (16 per cent.) in September. Skies were unusually cloudy in the hills, but in the plains the cloud amount was either normal or in defect. Humidity and temperature did not differ appreciably from the average.

The retreating South-West monsoon period, October to December.—In October the monsoon was very weak and gave but little rain after the 17th, so that the month's total fall was largely below normal. November and December were abnormally dry. The cloud portion was high in the hills and at Sibsagar, normal at Dibrugarh, and in defect at the other observing stations. Humidity tended to be low. Temperature was about the average."

Price of food-grains and their connection with vital occurrences.

The crop for the year was normal, and common rice was on an average, cheaper than in the preceding year.

SECTION II.

EUROPEAN ARMY.

(No remarks.)

SECTION III.

NATIVE ARMY.

(No remarks.)

SECTION IV.

JAILS.

(No remarks.)

SECTION V.

GENERAL POPULATION.

Vital Statistics.

General census figures. Provincial birth and death-rates. Comparison with other provinces.

2. The census population of 1911, for the plains districts, amounting to 6,051,507, has been, as usual, the basis of calculation for the ratios in this report.

There has been no change in the areas under registration during the year.

The birth-rate of the province for the year 1918 was 34.98 and is compared below with the rates recorded in other provinces in India :—

Provinces.	Birth-rate.		
	1912-16.	1917.	1918.
1	2	3	4
Assam	32.46	31.35	34.98
Bengal	33.3	35.91	32.9
Bihar and Orissa	40.82	40.4	37.51
Central Provinces	48.18	48.13	43.24
Madras	32.1	32.37	28.89
Burma	33.80	36.25	33.01
Bombay	36.09	35.72	31.61
United Provinces	44.91	46.08	39.89
Punjab	45.2	45.3	39.6
North-West Frontier Province	34.30	32.11	30.58

Assam is the only Indian province which for 1918 records a higher birth-rate than that of the previous year and that of the previous quinquennium. It would appear to indicate that until stricken by the pandemic of influenza, the public health was unusually prosperous.

The death-rate for the year was 46.10 and is compared below with the rates recorded in other provinces in India :—

Provinces.	Death-rate.		
	1912-16.	1917.	1918.
1	2	3	4
Assam	27.36	27.09	46.10
Bengal	30.2	26.19	38.1
Bihar and Orissa	30.70	35.2	56.71
Central Provinces	37.03	36.06	102.60
Madras	22.9	26.23	43.01
Burma	25.62	25.30	39.59
Bombay	30.09	40.76	88.05
United Provinces	31.55	37.91	82.37
Punjab	31.2	37.9	81.0
North-West Frontier Province	25.50	29.95	70.30

These figures speak for themselves and testify what havoc the pandemic of influenza has wrought. Some consolation may be found in the observation that Assam has suffered less severely than other parts of India.

3. The total of 211,717 births was registered during the year 1918 as compared with 189,741 during the preceding year, showing an increase which amounts to 21,976. The birth-rate per mille for the year was 34.98 as compared with 31.35 for 1917 and 32.29 for the quinquennial

Birth registration—General.

average. As compared with last year, the birth-rate was higher in six districts, the largest increase (6·31 per mille) being reported from Sylhet.

4. The birth-rate in those urban areas in which registration is compulsory was 33·31 as compared with 30·23 in 1917, 27·31 in 1916, Birth registration in urban areas. 29·77 in 1915 and 26·64 in 1914. The towns of Barpeta (52·61), Jorhat (40·9), Tezpur (39·02), Gauhati (37·89), Goalpara (35·54), Dhubri (34·09), Nowgong (34·05) and Sunamganj (33·76) have returned birth-rates above the urban average, showing their share in the general provincial increase in fertility. No town has reported a birth-rate below 20 per mille.

5. The total number of births registered in rural areas during the year amounted to 207,738 as compared with 186,130 in 1917, showing an Birth registration in rural areas. increase of 21,608.

Immigration and the redistribution of circles since the last census have disturbed the ratio between population and vital occurrences in certain areas and rendered detailed criticism of the figures from different circles unprofitable.

6. The total number of deaths recorded during the year was 279,034 and the death-rate per mille of the population was 46·10. For Death registration—General, comparison with normal years it may be noted that in the preceding year the number of deaths recorded was 163,925 and the death-rate per mille was 27·09, while the average of the preceding five years gave a mortality of 27·77.

7. The total number of deaths registered in twenty towns in which registration is compulsory was 3,949 against 2,622 in the previous year, Death registration in urban areas. showing an increase of 1,327 deaths.

8. In 1918, 275,085 deaths were registered as compared with 161,303, showing an increase of 113,782. The rural death-rate for the Death registration in rural areas. year was 46·37 as compared with 27·19 in 1917, and 27·84, the quinquennial average.

The Majuli circle in Sibsagar, with a death-rate of 12·43, Lumding with 17·45, Sella in Sylhet with 22·1, would appear to be examples of bad reporting unless it can be believed that these circles escaped the influenza epidemic.

9. The subjoined table shows the result of the enquiries conducted by the vaccination inspecting staff in urban areas to test the accuracy Registration in compulsory areas. Prosecutions under Act IV (B. C.) of 1873. of registration of vital statistics during the non-vaccination season of the year 1918:—

Municipalities.	Unregistered vital occurrences detected during 12 months from October 1917 to September 1918.		Recorded vital occurrences during 12 months from October 1917 to September 1918.		Percentage of omissions.	
	Births.	Deaths.	Births.	Deaths.	Births.	Deaths.
1	2	3	4	5	6	7
Silchar	6	...	95	23	5·94	...
Hailakandi	4	2	49	30	7·54	6·25
Sylhet	8	4	437	311	1·79	1·26
Karimganj	5	1	103	63	4·62	1·56
Maulvi Bazar	8	4	65	32	10·95	11·11
Habiganj	5	1	117	205	4·09	48
Sunamganj	16	5	110	45	12·69	10·00
Dhubri	4	...	106	95	3·63	...
Goalpara	3	2	113	114	2·58	1·72
Gauhati	60	15	355	351	14·45	4·09
Barpeta	19	3	536	381	3·42	478
Carried over ...	138	37	2,086	1,650	...	...

Municipalities.	Unregistered vital occurrences detected during 12 months from October 1917 to September 1918.		Recorded vital occurrences during 12 months from October 1917 to September 1918.		Percentage of omissions.	
	Births.	Deaths.	Births.	Deaths.	Births.	Deaths.
1	2	3	4	5	6	7
Brought forward ...	138	37	2,086	1,650	...	...
Tezpur ...	7	...	87	47	7.44	...
Mangaldai...	4	5	12	28	25.00	15.15
Nowgong ...	17	8	196	165	7.98	4.62
Sibsagar ...	3	1	51	43	5.55	2.27
Nazira ...	8	...	26	20	23.53	...
Jorhat ...	12	1	71	20	14.45	4.76
Golaghat ...	6	...	61	39	8.95	...
Dibrugarh...	41	16	268	128	13.26	11.11
North Lakhimpur ...	6	3	36	25	14.28	10.71
Shillong ...	17	4	471	312	3.48	1.26
Total ...	259	75	3,365	2,477	7.14	2.93

Detailed criticism of these figures is unprofitable as the number of omissions discovered depends on the activity of the investigating officers, and for this reason the maximum figures are probably nearer the actual defect in registration than the lower ones.

The average fine per head was rupee one and annas two.

Registration in Gauhati is bad and I attribute this to the fact that this Municipality has retained the system of registration through "gaonburas" while other Municipalities have adopted the system of registration through Sanitary Inspectors.

10. The subjoined table shows the recorded birth and death-rates in the hill

Registration in hill districts. districts in 1918, compared with those of 1917 :—

Districts.	1918.		1917.	
	Birth-rate.	Death-rate.	Birth-rate.	Death-rate.
1	2	3	4	5
Khasi and Jaintia Hills ...	27.45	55.72	28.02	24.86
Naga Hills ...	15.46	47.71	16.77	19.60
Lushai „ ...	40.43	35.55	40.76	31.75
Garó „ ...	25.64	34.99	27.96	21.11

These figures are of varying import. In the Lushai Hills, reporting is believed to be comparatively accurate and if reliance can be placed on these figures, the Lushais seem during the period under review to have suffered but little from influenza, as compared with the Khasis, Nagas and Garos. The Garo Hills also suffered from cholera, and apparently *kala-azar* is showing a tendency to increased activity among their population. The population from which the figures furnishing the above-quoted ratios is derived is however too small to justify detailed criticism, as registration in the Khasi, Naga and Garo Hills is only partial.

11. The subjoined table shows the birth and death-rates reported from tea estates for the year 1918, calculated on the census population of 1911 :—

Registration in tea gardens.

Districts.						Birth-rate.	Death-rate.
1						2	3
Cachar	...	...	...	...	...	31.86	47.41
Sylhet	...	...	...	...	...	34.11	42.21
Goalpara	...	...	...	...	...	41.90	33.33
Kamrup	...	...	...	...	...	53.63	44.85
Darrang	...	...	...	...	...	36.93	58.97
Nowgong	...	...	...	...	...	26.36	45.46
Sibsagar	...	...	...	...	...	37.37	62.89
Lakhimpur	...	...	...	...	...	37.90	64.82
Total						35.41	55.23

In common with the rest of the population the tea estates shared in the rise in the birth-rate, and in the high influenza mortality.

12. The total number of births and deaths registered within railway limits during the year 1918 was 78 and 431, respectively, against 53 and 293, respectively, in the preceding year.

Registration on railways.

13. The seasonal incidence of births was not materially disturbed, January, November and December showing, as usual, the largest figures. Had the favourable rates of the first six months prior to the appearance of influenza been maintained throughout the year, it is probable that for Assam the birth-rate would have been unusually high.

Seasonal incidence of births and deaths.

The death-rate began in August to show the effects of the influenza epidemic and rose to its height in November, being little less in December, *vide* figures in Table III.

14. The infantile mortality calculated on births of the year was 226.22 for males, 207.17 for females, total 216.95, as compared with male 198.94, female 179.03 and total 189.23 in 1917.

Mortality according to age, sex and class.

The relatively small increase in the infantile mortality as compared with the general death-rate which is almost doubled, shows that the incidence of influenza upon the infant population was by comparison light.

15. During 1918 the vaccination staff tested 73,011 vital occurrences, *i.e.*, 41,587 births and 31,124 deaths; this number being in excess of that for 1917 by 9,873. The number of villages visited was 5,244 as against 4,933 in 1917, and the percentage of omissions discovered was 4.42 as against 2.9 in 1917. This record shows a satisfactory increase in activity in this branch of work. In Kamrup, as many as 417 omissions were discovered in the Palashbari circle, to the defective registration of which I have frequently called attention in these annual reports. The percentage of omissions discovered was highest in Kamrup with (11.41), followed by Darrang with (6.42) and Goalpara with (6.02). The percentage of omissions discovered was lowest in Lakhimpur where only (1.62 per cent.) of omissions was detected.

Inspection of village registers of vital statistics.

As in the preceding year, the names of those gaonburas in whose circles omissions in registration had been discovered, were reported to the Deputy Commissioner of the district, as the proper performance of this branch of the gaonburas' duties is taken into consideration in granting rewards for their general efficiency.

Nowgong, which tops the list with the largest number examined, shows also the smallest percentage of omissions, with the exception of Lakhimpur. This is almost certainly due to the attention which has been paid to vital statistics and vaccination in this district for some years back by the district authorities, and demonstrates the improvement which has resulted therefrom.

General accuracy of vital statistics and improvement effected during the year.

16. The agency for the collection of vital statistics both in urban and rural areas remained the same as in previous years.

SECTION VI.

HISTORY OF CHIEF DISEASES.

17. The subjoined table compares the ratios of the chief causes of mortality in Chief causes of mortality. 1918 with those of the preceding decennium :—

Disease.	1908-17.			1918.		
	Urban.	Rural.	Combined.	Urban.	Rural.	Combined.
1	2	3	4	5	6	7
Cholera	2·36	2·70	2·70	1·07	2·35	2·32
Small-pox	·67	·54	·54	·29	·40	·40
Plague	...	...	...	·008	·0001	·0003
Fevers	9·20	15·03	14·91	7·55	26·63	26·25
Dysentery and diarrhœa	3·04	2·43	2·49	4·09	2·03	2·07
Respiratory diseases	1·14	·66	·67	9·36	8·04	8·06
Injuries	·45	·32	·32	·61	·32	·33
All other causes	6·24	6·03	6·04	10·07	6·57	6·64
Total	23·12	27·78	27·69	33·06	46·37	46·10

In urban areas the increase under the head “all other causes” is probably due to the inclusion under this heading of deaths due to influenza in those towns which are not provided with medical registrars. The increase under respiratory diseases is due to influenza. The decrease in the urban cholera mortality which is only half that of the previous decennium, may fairly be attributed to better sanitary conditions, in view of the fact that the rural cholera mortality uninfluenced by sanitary improvements shows no appreciable reduction. In rural areas the increase under the heads “fevers” and “respiratory diseases” is due to the outbreak of influenza.

Influenza —

Districts.	Fevers.		Re spiratory diseases.		All other causes.		Total of columns 2, 4 and 6.	Total of columns 3, 5, and 7.	Excess of columns 8 over column 9.	Influenza recorded as such.	Total mortality from influenza total of columns 10 and 11.	Ratio per 1,000 of population.
	1918.	Average of quinquennium.	1918.	Average of quinquennium.	1918.	Average of quinquennium.	1918.	Average of quinquennium.				
1	2	3	4	5	6	7	8	9	10	11	12	13
Cachar ...	5,678	1,915	611	141	1,732	1,259	8,221	3,315	4,906	2,480	7,386	15·70
Sylhet ...	24,561	12,461	1,255	610	9,947	8,739	55,763	21,810	13,953	10,727	24,680	9·98
Goalpara ...	15,149	6,181	158	29	237	343	15,544	6,553	8,991	1,123	10,114	16·83
Kamrup ...	19,010	3,179	250	72	1,345	907	20,605	4,158	16,447	255	16,703	25·00
Darrang ...	5,607	2,473	540	190	1,028	1,020	7,175	3,683	3,492	5,639	9,331	24·73
Nowgong ...	6,061	1,641	130	31	487	457	6,678	2,129	4,549	2,470	7,019	23·11
Sibsagar ...	8,169	3,224	1,497	249	1,542	1,368	11,203	4,841	6,367	7,874	14,241	20·63
Lakhimpur ...	7,278	2,160	2,895	327	1,381	1,208	11,554	3,695	7,859	5,628	13,487	28·75
Khasi and Jaintia Hills.	493	120	66	21	303	248	862	389	473	1,375	1,848	34·07
Naga Hills ...	63	16	28	3	45	12	136	31	105	...	105	22·87
Lushai Hills ...	435	227	604	305	59	89	1,098	621	477	...	477	5·23
Garo Hills ...	805	288	3	5	19	25	827	328	499	...	499	11·13
North-East Frontier.	730	166	...	1	...	...	730	167	563	...	563	...
Total ...	94,289	34,061	8,037	1,984	18,125	15,675	120,401	51,720	68,681	37,771	106,452	17·04

Although Assam suffered less severely from influenza than many other parts of India and escaped with a death-rate only slightly higher than the least severely affected province (*vide* paragraph 2), yet the havoc wrought by the pandemic was such that to avoid lapses into emotionalism unbecoming in an official report, one seeks safety in a rigid adherence to facts and figures, eschewing all temptations to depict in detail the exceedingly moving picture of death, bereavement, sorrow and privation of which these facts form the barest outline. In four months more than one hundred thousand persons would appear to have died of influenza in Assam or nearly eighteen out of every thousand, and of these, the majority were vigorous people in the prime of life.

Date of origin.—In general, the first wave appeared about the middle of July, was mild in type and almost without influence on the mortality statistics.

In the North-East Frontier district, Lushai Hills, and Naga Hills, the early wave was not noticed at all. In the Khasi and Jaintia Hills it was seen in July, in Manipur it appeared in the middle of September, and in the Garo Hills it was first seen in the middle of August. The plains districts were universally and lightly attacked in July and August by the first wave, but in the tea gardens of Nowgong the incidence was later, occurring in September and being for the most part light. The virulent second wave started almost simultaneously throughout the province about the middle of October, reaching its greatest intensity in November, and subsiding for the most part about the end of December. In Sylhet, however, the outbreak seems to have been of somewhat lesser intensity but of much longer duration, continuing well beyond the period under review into the early months of 1919. This virulent return wave appears to have traversed much the same population as was afflicted by the earlier attack, with the exception however of the tea gardens of Nowgong, none of which experienced the virulent return wave except the remote tea estate of Kuturi, which, being attacked on 3rd December 1918, had 212 persons attacked out of a population of 276, with 46 deaths.

No particular classes or areas seem to have been affected more than others, indeed the incidence of the disease was extremely capricious, for instance the labour forces of adjoining tea gardens, affected very much about the same time, and not apparently differing in any way in composition or economic conditions of life, would yet differ greatly both in the severity of the disease and in its type. Some isolated facts are interesting and perhaps worthy of records. In the North-East Frontier district it was remarked that greater mortality occurred in the Abor villages adjoining the plains, the case of the village of Berung with a mortality approaching 60 per cent. of the population being cited. Others have noted that, as might be expected, the poorer classes, and those dwelling in insanitary areas, *e.g.*, in congested tea garden lines and in a crowded town like Barpeta, suffered more severely than those living under better hygienic conditions.

Mortality.—The table which heads this paragraph shows the figures on which the estimate of a mortality of 106,452 in a population of 6,241,330 or 17·04 per mille is based. It may be explained that the method adopted in making this estimate has been to subtract from the mortality recorded from fevers, respiratory diseases, and all other causes, the quinquennial average of these figures, adding to this remainder the mortality recorded from influenza as such. This calculation is necessitated by the fact that no separate registration heading for 'influenza' exists in the vital statistical returns, and the influenza deaths were consequently distributed for the most part under the three headings mentioned, only a few returns being received which recorded actual influenza mortality. That this calculation bears some reference to actualities is shown by subtracting from the total mortality ratio for the year, *viz.*, 46·1, the influenza ratio of 17·04. The difference is 29·06, which should be the total mortality ratio per mille, excluding influenza, whereas the average of the previous quinquennium was 27·7 when influenza was absent. Of the plains districts Lakhimpur seems to have suffered most severely and of the hill districts the Khasi and Jaintia Hills shows a very high mortality on the recorded figures. The calculation is however an understatement in regard to the hill districts as registration is imperfect, and full statistical records of the epidemic are not available, although it is known to have been very fatal in hill villages.

Incidence and case mortality.—This is not capable of estimation for the general population, but certain figures for sections of the community are available. Thus in a jail population of 2,381, the number of cases was 836, deaths 14, and the case mortality 1·67 per cent.

From among the Assam Rifles the following figures are available :—

Place.	Population.	Attacks.	Incidence.	Case mortality.
1	2	3	4	5
Sadiya	265	145	51·7 per cent.	8·9 per cent.
Lushai	...	832	...	2·7 „

Tea gardens.

Subdivision.	Name of garden.	Population.	Number of cases of influenza.	Sickness rate per 1,000 of population.	Number of deaths from influenza.	Death-rate per 1,000 of population.	Death-rate per 100 cases of illness.
1	2	3	4	5	6	7	8
North Lakhimpur	Dejoo	2,287	1,048	458·2	47	20·5	4·4
	Joyhing	3,300	1,979	599·6	174	52·7	8·8
	Pathalipam	1,427	1,000	700·7	85	59·5	8·5
	Bordeobam	1,283	700	545·5	7	5·4	1
	Lilabari	1,081	547	506·0	35	32·3	6·4
	Seajuli	836	750	897·1	167	199·7	22
	Silonibari	1,668	1,200	719·4	100	59·9	8·3
	Doolahat	1,767	374	211·6	49	27·7	13
	Harmutty	1,891	1,250	661·0	71	37·5	5·6
	Total	15,540	8,848	569·3	735	47·2	8·3
Dibrugarh	Jokai Tea Company ...	12,218	...	...	382	31·2	...
Jorhat	Total of tea gardens in charge of Dr. Murphy,	22,889	9,723	424·7	982	42·9	10·1
	Cinnamara	1,769	858	485·	75	42·3	8·7
	Gurreahabbee	477	178	373·1	6	12·5	3·3
	Bokahola	841	33	3·2	14	16·6	42·4
	Dekhiajuli	917	1,461	1,593·2	75	81·7	5·1
	Sycotta	878	383	436·2	73	83·1	19·0
	Korukuthea	1,641	1,854	1,129·7	120	73·1	6·4
	Marmuria	1,299	430	331·0	47	36·1	10·9
	Total of Jorhat Subdivision ...	7,822	5,197	664·4	410	52·4	7·8
Golaghat	Badlipar Tea Company ...	12,868	5,606	435·6	435	33·8	7·7
Sibsagar	Assam Company, Nazira ...	19,400	9,710	500·5	443	22·8	4·5
	Borahi tea estate	516	475	920·5	20	38·7	4·2
	Lakwah Tea Company, Limited	2,665	1,475	553·4	46	17·2	3·1
Nowgong	Kuturi	276	212	768·1	46	166·6	21·7
Tezpur	19 tea estates under Dr. Forsyth.	25,445	6,968	273·8	546	21·4	7·83
Sylhet	Baraooora tea estate ...	2,871	1,099	382·7	53	18·4	4·8
	Grand total	1,25,10	49,3·3	447·1	4,098	33·4	7·5

The tea-garden figures are valuable in that they are more or less reliable and are worth scrutinizing in detail. In regard to the figures for North Lakhimpur supplied by Dr. Fraser, it is interesting to note that in two gardens which were infected late, namely, Doolahat in the middle of October and Seajuli about the end of it, the case mortality is high in both and the death-rate exceptionally high in the latter. This may be compared with the outbreak in Kuturi, Nowgong, and seems to suggest that the later the attack, the more fatal the result. The figures for the group of tea estates in Jorhat, which show a case mortality of 7·8 and a death-rate per mille of 52·4, and those for tea estates in North Lakhimpur with a case mortality of 8·3 per cent. and a death-rate per mille of 47·2 are significant of the conditions which are described as follows by Dr. Forsyth in an interesting and valuable report on the outbreak in a large group of gardens in the Tezpur subdivision—“The epidemic appears to have been one of the greatest disasters that have befallen the tea industry in Assam. In the group of gardens dealt with, the death-rate for the year has been more than doubled by the disease, it being on the total labour force 2·9 per cent. from influenza, and 2·42 per cent. for all other causes for the year.”

It would appear from figures which relate to some 122,510 souls, that the tea industry in the Assam Valley has lost on the average about 33 per 1,000 of its labour population, the loss being chiefly from among those of most active age groups. The tea-garden population in the Brahmaputra Valley of adults and children was estimated to be in 1917-18, 682,129 and on the above estimate the figure of 22,510 should represent an approximation to the total mortality from influenza, and gives perhaps some measure of the extent of the economic loss to the industry from the influenza pandemic.

I am indebted to the following medical officers of tea estates for the figures and facts on which the above remarks are based—Dr. J. Dodds Price, Dr. Charles E. P. Forsyth, Dr. P. Fraser, Dr. Percy Foster, Dr. John Hewan, Dr. Macnamara, Dr. R. Murphy and Dr. W. Russel.

The Civil Surgeons of Cachar and of Sylhet have not been successful in obtaining any figures in regard to the mortality on tea estates in the Surma Valley tea districts and no estimate of the mortality from influenza among the garden labour population of that division is possible.

In regard to the general population the facts are less precise. The mortality was undoubtedly very severe in the hill districts, estimates of a 50 per cent. to 60 per cent. mortality in certain areas being furnished. The Civil Surgeon, Manipur, estimates the mortality in the villages at 20·25 per cent. of the population. In the town of Tura, with a population of 1,586 there were approximately 350 attacks and 10 deaths approximately 6·3 per mille. The Civil Surgeon, Khasi and Jaintia Hills, remarks on the high mortality, at least 50 per cent. among hospital cases. In the town of Nowgong 11 per cent. were attacked and the mortality was 8·1.

Type.—The current medical literature regarding the symptoms of the disease is extensive and no good purpose would be served by a repetition in this report of the symptoms recorded, which are typical of the pandemic throughout the world. It is sufficient to note that epistaxis was noticeable in the Lushai and Garo Hills, and that nearly all observers comment on an abdominal type with intractable diarrhoea which may have been at times mistaken for cholera. In tea garden work the occurrence of a rash was occasionally observed and it was noted that the disease was capricious both in type and in incidence, the type varying markedly in adjacent gardens.

Treatment.—In reading the reports submitted by Civil Surgeons and medical officers in regard to treatment, one gathers that all are agreed as to the value of early symptomatic treatment, ample nourishment, warm clothing, fresh air, and rest in bed. In regard to drugs as specifics it is a case of ‘quot homines tot sententiæ.’ Many different remedies are suggested as possibly having done some good, but the variety of the remedies so recommended seem to warrant the conclusion that there is no drug specific for the disease.

Preventive measures.—While in normal times we are entirely unprepared to grapple with an epidemic of any magnitude, it is to be deplored that this pandemic came upon us when the medical cadre was depleted to an unprecedented condition, both by the demands of the great war, and by those of the Kuki Expedition, to man which our weakened medical cadres had been still further reduced. While nothing could have stayed the plague, we were thus exceptionally badly equipped for the amelioration of its ravages. The best that could be done was done by district officers, all available Sub-Assistant Surgeons were put on special duty in connection with the

epidemic, vaccination work was suspended and vaccinators and the vaccination inspecting staff were converted into health visitors and sent out to distribute drugs and vernacular pamphlets regarding the disease, its mode of spread, and the manner in which it should be treated. In tea gardens segregation, 'influenza tablets' and gargles were tried, the consensus of opinion being that these measures as applied were usually unsuccessful but one medical officer appears to have had some success with segregation measures, efficiently applied and it is noteworthy that certain jails which were rigidly segregated escaped the second virulent attack. In some instances nasal sprays were in use, with what degree of success it is difficult to ascertain. *Ayurvedic* medicines had their votaries and the *Tulsi* plant, containing thymol, formed an ingredient of some of them.

In so far as possible, funds were provided by Local Boards but Government contributions were also made, and private charity was more or less successfully invoked to meet the emergency. The district organisations in Sibsagar under the personal supervision of the Deputy Commissioner, Mr. B. C. Allen, I.C.S. (the Civil Surgeon having been incapacitated by an attack of the disease), and in Darrang, under the control of the Civil Surgeon, Major McCoy, I.M.S., may be mentioned as examples of making the best use of available resources.

Early in the advent of the virulent return wave, the urgency of obtaining an efficient protective vaccine was realised. The staff and resources of the Provincial Laboratory were placed at the disposal of Captain Knowles, I.M.S., Director of the Pasteur Institute, Shillong, who employed the whole of the available resources of the Pasteur Institute in the manufacture and issue of a vaccine which was aimed at immunising against those pulmonary complications of the disease which seemed in most cases to be the immediate cause of death. This vaccine under the designation 'P. I. P.' has been very largely used, chiefly on tea estates, 19,000 c.c. having been issued up to the end of 1918. While exact figures are not yet available, its users continue to show their belief in its utility as a prophylactic, by the repetition of their indents on a large scale and several medical officers have also expressed a belief in its utility as a curative measure, if administered in the early stages of the disease. After the close of the year under report, the demand for this and other vaccines has become so large as to necessitate starting a special vaccine section at the Institute for their supply. No attempt is made in this note to estimate statistically and critically the value of the vaccine, as this will be done elsewhere and in due course by Captain Knowles from the figures at his disposal.

Recommendations as to future action are difficult to frame. A distinguished British public health authority recently defined the present position as follows:—"I know of no public health measures which can resist the progress of pandemic influenza." This being the recognised attitude of public health experts it would at first appear that we can do little else than admit our impotence, and confess that we await from research, results which will enable us to do better next time.

Local recrudescences of the disease are, however, to be expected and it is necessary that we should have some scheme on which to work, if, while yet relatively defenceless, we are again attacked. The consensus of expert opinion appears to be that although national prevention is at present impossible, personal and communal prophylaxis is not without value if thoroughly understood and intelligently practised. One would therefore make a few suggestions as to measures which should be tried. First, it seems necessary that in the event of another outbreak of virulent influenza, Government should have powers under the Epidemic Diseases Act to limit, as far as possible, human aggregation by prohibiting public gatherings, by closing schools, clubs and places of public entertainment, etc., and also to insist on the wearing of masks under certain conditions if further bacteriological experiments and recent practical trials confirm their value as a protective.

In support of the former recommendation it may be noted that as the virulent return wave coincided with the celebrations of the Armistice in November, social gatherings of European residents were held in several districts in Assam, in spite of the strongly expressed disapproval of local medical men. A recent case is on record where, in a northern English town, some 140 persons attended a dance, of whom 122 went down with influenza and 12 died. It was by great good fortune that no similar tragedy was recorded from Assam, but it is probable that some gardens derived the first infection of their labour force from the attendance of servants at those gatherings. Under the same powers, notification of influenza cases, coupled with segregation of contacts, should be legalised as adoptive measures in communities who are sufficiently educated to understand the utility of such measures and to submit to their enforcement.

Second.—As droplet infection is at present believed to be the most potent method of infection, every effort should be made to create popular opinion against promiscuous sneezing and coughing, and against the appearance in public of persons suffering from such symptoms. There seems little doubt that when influenza is about, a man has no more right to mix with his fellow men when he is sneezing and coughing than he has when he is 'peeling' after scarlet fever or when spotted with the eruption of small-pox.

Third.—If the value of a vaccine either as an efficient protective against complications or as a prophylactic against the disease can be statistically demonstrated, opportunities for inoculation should be widely and generously made available, as at present it seems the only remedy which appears to offer any suggestion of utility.

Fourth.—Efficient "staff work" is wanted to enable us to utilize effectually and speedily all available resources when an outbreak is threatened, and a definite plan of action should be ready in every district, bearing in mind what is useful and what is not. For instance, the uselessness of distributing 'influenza tablets' as 'placebos' to villagers who do not want them and have no faith in them, who, in some cases, look on the visit of the person who offers them as a dangerous intrusion on the sphere of influence of the Goddess *Sitala*, should be kept in mind when framing these relief measures, in view of the probability that these remedies are only of value to those who believe in their efficacy.

18. Cholera—

Districts.						Death-rate per mille.	
						1908-1917.	1918.
1						2	3
Cachar	...	...	...	...	...	2.11	3.44
Sylhet	...	...	...	...	...	2.60	3.67
Goalpara	...	...	...	...	...	2.09	2.43
Kamrup	...	...	...	...	...	3.72	.97
Darrang	...	...	...	...	...	3.57	1.58
Nowgong	...	...	...	...	...	4.50	.16
Sibsagar	...	...	...	...	...	2.68	.71
Lakhimpur	...	...	...	...	...	1.34	.22
Total						2.70	2.32

Some of the deaths attributed to cholera were possibly due to gastro-intestinal influenza. The Civil Surgeon, Cachar, and his Assistant Surgeons and Sub-Assistant Surgeons inspected some villages reported to be infected with cholera and considered that some of the cases were in reality suffering from influenza of the gastro-intestinal type. True cholera was, however, undoubtedly prevalent in Cachar during the last quarter of the year, and also in Sylhet where it broke out in epidemic form in October, and spread throughout the district during November and December. The usual procedure was adopted in dealing with it, Sub-Assistant Surgeons in charge of dispensaries, in so far as possible, rendered medical aid to patients residing within 5 miles of their dispensaries and 'Epidemic Doctors' and 'Epidemic Compounders' distributed medicines and leaflets containing directions for the prevention of cholera.

It is possible that in Sylhet also, as in Cachar, the gastro-intestinal type of influenza may in some cases have been mistaken for cholera and reported as such. It is noticeable, however, that in the Assam Valley districts in which influenza was equally virulent, the recorded rates for cholera are well below the average, and unless a different type of influenza was prevalent in the Surma Valley, it seems unlikely that a large proportion of the cholera deaths in the latter valley was due to influenza wrongly diagnosed.

19. During the year under report, the towns of Maulvi Bazar and Habiganj in the district of Sylhet reported high death-rates of 8.44 and 3.20, respectively, from cholera. It appears probable that the infection was imported from the surrounding rural areas where it was prevalent in epidemic form, and as these small towns have no health staff and their standard of sanitation is low, the

High rates of mortality from cholera in individual towns and rural areas.

usual results followed importation. The death-rates returned by Mangaldai town (4·58), Goalpara (3·52) and Dhubri (3·27) seem high, and require explanation. The population of the town of Mangaldai is only 654 according to the census of 1911, and the total number of deaths returned during the year was 3 (2 in January and 1 in November). Excluding outside cases which were not infected within the town, being emigrants admitted to hospital from river steamers, the ratio for Dhubri works out to ·34 as out of 19 deaths, 17 occurred among emigrants. In the town of Goalpara, out of 21 cholera deaths, 13 were reported in November when the disease was prevalent in epidemic form. The town has got a sanitary inspector and endeavours have been made to improve its sanitation, but the water-supply of the town is very bad, and the control of dangerous pollution is impossible, and it is to be hoped that the project for a pipe water-supply may have some chance of being financed in the near future.

Rural circles which reported death-rates between 5 and 8 per mille from cholera were the following:—Kanairghat (8·44), Habiganj (7·01), Sulla (5·38), Sunamganj (5·36) and Nabiganj (5·26), Dhubri (6·01) and Lakhimpur (5·14) and Sorbhog (5·32). These figures indicate a widespread and sharp epidemic in Sylhet with more localized outbreaks in Goalpara and Kamrup.

20. The total number of deaths from cholera reported from tea estates during the year 1918 was 1,278 as compared with 953 in the preceding year, the ratios per mille of population being 1·82 and 1·35, respectively. The highest rates of 3·12 and 2·09 were reported by tea estates in the districts of Cachar and Sylhet, respectively, where cholera was prevalent among the indigenous population.

21. *Small-pox*—

Districts.	Death-rate per mille.	
	1908-1917.	1918.
1.	2	3
Cachar	·29	·49
Sylhet	·28	·11
Goalpara	·62	·27
Kamrup	1·47	1·65
Darrang	·87	·08
Nowgong	1·05	·05
Sibsagar	·57	·81
Lakhimpur	·10	·14
Total	·54	·40

The death-rate from small-pox for the year was generally less than the average of the preceding decennium. The Civil Surgeon of Kamrup having reason to doubt the accuracy of reports of deaths from small-pox, made some enquiries which showed that, as there is but one vernacular name for small-pox, measles, and chicken-pox, deaths from these diseases are commonly included in the small-pox mortality. This condition which is common to the other Assam Valley districts may explain a small-pox mortality in Kamrup, which is higher than one would expect in view of the increase in the number of vaccinations performed during the last few years. The figure for Nowgong remains satisfactorily small.

22. *Towns*.—Golaghat heads the list with a mortality of 4·47 which is much in excess of what one would expect in an area in which vaccination is compulsory, and is due to some laxity in the administration of the provisions of the compulsory Act. Dibrugarh suffered from an epidemic of small-pox, and had a small-pox mortality of 1·44. The outbreak was probably not entirely unrelated to some previous inattention to the enforcement of compulsion, now fortunately rectified. Karimganj, Sunamganj, Silchar and Sylhet had a few cases and the rest were free.

Rural areas.—Kamrup, with its Mahapurushia areas, notably that of Barpeta which heads the list with a mortality of 5·95, still shows a bad pre-eminence in small-pox prevalence, which is largely due to neglect of vaccination in former years

The efforts of the Civil Surgeon and his inspecting staff, greatly aided by the Deputy Commissioner, Mr. Bentinek, should in a year or two result in an appreciable reduction of mortality from small-pox in Kamrup. The Surma Valley districts were lightly affected.

23. Fevers—

Districts.						Death-rate per mille.	
						1908-1917.	1918.
1						2	3
Cachar	...	...	...	...	...	12·17	22·09
Sylhet	...	...	...	...	...	12·32	19·51
Goalpara	...	...	...	...	...	26·16	46·13
Kamrup	...	...	...	...	...	16·03	41·40
Darrang	...	...	...	...	...	19·52	26·56
Nowgong	...	...	...	...	...	16·47	33·11
Sibsagar	...	...	...	...	...	12·39	20·18
Lakhimpur	...	...	...	...	...	11·89	23·16
Total						14·91	26·25

The increased death-rate from fevers in all districts is due to the inclusion in this category of many deaths due to the pandemic of influenza, apart from which it cannot be discussed, except to record the conjecture, that in the absence of influenza the malarial death-rate would probably have been a light one.

During the year no malarial research officer was available for systematic research work, and I myself carried out such observations as time permitted. A visit was paid to Pasighat, a military outpost on the North-East Frontier, which has become intensely malarious during the last few years, and a series of observations were initiated and carried on during the hot weather and rains of 1918, whereby all possible breeding grounds of mosquitos were watched, their larvæ collected and hatched by the Assistant Surgeon in charge of the station and despatched to me for identification. Adult mosquitos were also caught within mosquito nets and in dwelling houses, and were similarly identified. From these and other similar observations, the breeding grounds were discovered to be a stream called the 'Mora Lalli,' and the species of mosquito concerned in the propagation of the disease was determined to be *N. Maculatus*. Practical measures for mitigating the malariousness of the place by jungle clearance, by 'draining' the stream, and by the installation of oil 'drippers,' are now being put in operation.

A visit was also paid to Haflong in January to advise as to how the prevalence of malaria in a Convent School could be abated. The time of year was not such as to permit of any precise malariological observations being made, but it was possible to frame recommendations on general lines as to the clearance of neighbouring jungle, the stone pitching of water-logged drains in adjacent *nullahs*, and the use of mosquito nets, which should largely reduce the trouble. The anti-malarial operations at Lumding, which are being carried out by the Assam-Bengal Railway, are as yet incomplete, and Dr. Francis, the Chief Medical Officer, informs me that "The progress on the drainage scheme has been most disappointing this year owing to causes directly traceable to the influenza outbreak." There was much illness and some deaths among the imported labourers, and the contractors were unable to recruit labour from the usual sources and a good deal yet remains to be done. No opinion can be formed as to the practical success of the scheme until at least a year after its completion, and consequently at the present stage comment is superfluous.

24. Amongst towns, North Lakhimpur and Mangaldai reported the highest rates of 42·55 and 24·46, respectively. There is no medical

High rates of mortality from fevers in individual towns and rural areas.

registrar of vital statistics in these smaller towns, and deaths from influenza were undoubtedly included under this head. High rates for fevers were reported from the

towns of Jorhat with 7·83, Nowgong with 7·17, Barpeta with 6·98, Dhubri with 4·47 and Silchar with 4·09, for which influenza was probably chiefly responsible.

As regards individual rural areas, four circles in Goalpara district, and one in Sibsagar reported very high rates from fevers; these appear to be due to an error in compilation, which I am investigating.

25. *Kala-azar*—

Districts.				1909.	1910.	1911.	1912.	1913.	1914.	1915.	1916.	1917.	1918.
1				2	3	4	5	6	7	8	9	10	11
Cachar ...	...	...	...	6	2	3	2	8	...	2	...	1	4
Sylhet ...	...	...	...	454	866	549	394	444	203	159	63	31	34
Goalpara ...	...	...	...	81	87	135	192	206	138	55	106	153	313
Kamrup ...	...	...	...	378	450	354	385	294	215	283	277	287	564
Darrang ...	...	...	...	643	627	679	563	399	317	310	320	245	263
Nowgong ...	...	...	...	140	221	286	308	417	393	419	451	591	565
Sibsagar ...	...	...	...	1	...	34	31	29	24	5	28	181	235
Lakhimpur ...	...	...	...	...	50	11	...	...	8	...	3	1	3
Garo Hills ...	...	...	...	15	23	15	16	15	10	12	6	18	22
Total ...				1,718	2,326	2,066	1,891	1,813	1,308	1,245	1,254	1,508	2,003

Our watch and ward over the activities of this disease have occupied much time and involved the expenditure of considerable sums of money.

A report on the progress of the work during the greater part of the period now under review was published as a supplement to the Sanitary Report in November 1918. As detailed in that report, active operations have been carried out in the infected areas in the Sibsagar district, the results of which are promising. It may take some years to discover and eradicate latent foci of the disease, and to extinguish it finally where we have already discovered it, and it seems wise to refrain from too optimistic a forecast of immediate results. Considering the past history of the disease in the Lower Assam districts, there is some reason to believe that, had our operations not been undertaken, and if they were not continued, Sibsagar would probably have to suffer a fate like that of Nowgong between 1892 and 1900 when almost $\frac{1}{3}$ of the population died. The measure of our success will therefore be inversely as the rise of the district death-rate during the next 8 to 10 years, and in comparison with the history of the Lower Assam districts during the decade following the first appearance of the disease.

The Sibsagar figures for 1918 show an increase, but the effect of our measures in dealing with a disease which is slowly fatal would not yet be statistically evident. The *kala-azar* hospital on the Mitha Pukri near Nazira, was under construction during the year, and may possibly be open in the spring of 1919. The outbreak on the tea estate of Duria appears to have been satisfactorily controlled, and should ultimately be extinguished.

Surveys both of tea gardens and of villages have been in progress in the Dibrugarh and North Lakhimpur subdivisions which, although incomplete at the time of writing, tend to show that both areas are practically free from the disease.

The Nowgong mortality has somewhat decreased, and most of it appears to have occurred in a badly infected area round Kathiatoli, in which active measures are in operation. A feature of the Nowgong work under the supervision of Dr. Dodds Price, has been the popularity and success of the intravenous treatment, administered at the Sadr dispensary, and on the one remaining infected tea estate.

The Kamrup figures have doubled since last year, owing to local exacerbations, which are receiving attention.

In Goalpara where the mortality is double that of the previous year, active measures of control were initiated after the close of the year in the infected area, and also in an adjoining area of the Garo Hills, where some badly infected villages have been discovered.

A great loss was experienced in the death in November from influenza of the Assistant Surgeon on *kala-azar* duty, Babu Suresh Chandra Mazumdar. This officer had been associated with these measures since 1912, his experience of the work was extensive, his judgment sound, his methods reliable, and his personal qualities admirably suited for the post.

26. *Dysentery and diarrhæa*—

Districts.						Death-rate per mille.	
						1908-17.	1918.
1						2	3
Cachar	...	...	...	...	...	2.42	2.39
Sylhet	...	...	...	...	...	2.11	1.96
Goalpara	...	...	...	...	...	.38	.30
Kamrup	...	...	...	...	...	1.12	1.08
Darrang	...	...	...	...	...	4.65	2.78
Nowgong	...	...	...	...	...	1.78	1.39
Sibsagar	...	...	...	...	...	4.57	3.31
Lakhimpur	...	...	...	...	...	4.92	4.05
Total						2.49	2.07

The death-rate for the year was somewhat less than the decennial average, an appreciable fall in the rates being recorded in the districts of Darrang and Sibsaagar.

The subjoined table shows the death-rates from these diseases on tea estates in 1918 :—

Sibsagar	...	...	...	...	...	...	8.04
Goalpara	...	...	...	...	...	...	7.07
Kamrup	...	...	...	...	...	...	6.95
Lakhimpur	...	...	...	...	...	...	6.40
Darrang	...	...	...	...	...	...	5.91
Sylhet	...	...	...	...	...	...	5.11
Cachar	...	...	...	...	...	...	5.03
Nowgong	...	...	...	...	...	...	4.81

The causes of this high mortality are becoming better understood among the leaders of the tea industry, and it is probable that, when normal conditions are re-established, extensive improvements of the conservancy of garden lines by the provision of septic tank latrines, and other appliances, will be carried out, which should materially reduce this heavy preventable mortality.

27. *Plague*.—Three cases of imported pneumonic plague occurred in April 1918, two of whom died. One of these cases occurred in a rural area in Kamrup district, one in the town of Silchar and one in the town of Sylhet. All necessary precautions, including the isolation of the sick, segregation of the contacts, burning or disinfection of the infected houses, and the maintenance of vigilance regarding rat infection, were successfully enforced to prevent the spread of the disease. The opportunity was taken of revising departmental circulars and orders for dealing with cases of plague in the light of modern views on the subject.

28. *Other causes*.—Deaths from respiratory diseases and all other causes have been the subjects of comment under influenza. The number of deaths from ‘Injuries’ was 2,021 as against 1,997 in the preceding year.

SECTION VII.

VACCINATION.

(Published separately.)

SECTION VIII.

SANITARY WORKS—MILITARY.

(No remarks.)

SECTION IX.

SANITARY WORKS—CIVIL.

General.

29. The total number of Municipalities and Unions during the year remained unchanged.

30. The aggregate income of fifteen Municipalities and eight Unions including opening balances amounted to Rs. 8,07,202 during the year 1918, of which Rs. 3,58,361 or 44·39 per cent. was spent on sanitation. The following table shows in sequence the percentage of income spent on sanitation by each during the year:—

Municipal expenditure on sanitation.

1. Sylhet Municipality	...	...	...	59·69
2. Gauhati „	...	...	...	55·54
3. Karimganj „	...	...	...	53·27
4. Maulvi Bazar Union	...	...	...	53·07
5. Tezpur Municipality	...	...	...	52·68
6. Jorhat „	...	...	...	51·98
7. Habiganj „	...	...	...	50·04
8. Shillong „	...	...	...	43·79
9. Silchar „	...	...	...	42·27
10. Goalpara „	...	...	...	41·61
11. Dibrugarh „	...	...	...	40·94
12. Nazira Union ...	...	...	...	40·56
13. Sunamganj Municipality	...	...	...	32·38
14. Barpeta „	...	...	...	30·31
15. Nowgong „	...	...	...	27·54
16. Sibsagar „	...	...	...	26·19
17. North Lakhimpur Union	...	...	...	24·52
18. Dhubri Municipality	...	...	...	24·33
19. Doom Dooma Union	...	...	...	20·19
20. Palashbari „	...	...	...	19·20
21. Hailakandi „	...	...	...	17·76
22. Golagbat „	...	...	...	17·17
23. Mangaldai „	...	...	...	16·08

Sylhet incurred considerable expenditure on water-supply in the completion of the new waterworks, and Gauhati on water-supply and conservancy.

The statement below shows the expenditure for sanitary purposes incurred during the year 1918 as compared with that of the preceding year:—

The comparative decrease in expenditure under the head 'water-supply' is due to the completion of work on the Silchar and Tezpur water-supply schemes in 1917.

Heads of expenditure.	Total expenditure.		Difference.	
	1918.	1917.	Increase.	Decrease.
1	2	3	4	5
	Rs.	Rs.	Rs.	Rs.
1. Conservancy, including establishment, road watering, latrines, etc.	1,76,773	1,71,803	4,970	...
2. Drainage	16,466	13,576	2,890	...
3. Water-supply	1,51,748	2,64,253	...	1,12,505
4. Disposal of the dead	347	624	...	277
Markets and slaughter-houses	6,650	9,247	...	2,597
Vaccination	2,217	2,476	...	259
7. Other sanitary works	4,160	5,791	...	1,631
Total	3,58,361	4,67,770	7,860	1,17,269
8. Construction and maintenance of roads	78,731	80,027	...	1,296
Total including roads	4,37,092	5,47,797	7,860	1,18,565

31. The usual charges on account of pay and allowances of the Sanitary Inspectors amounting to Rs. 11,000 were met from the Imperial recurring grant for the year, no other expenditure being incurred from that grant.

Sanitary works.

Surma Valley Division.

The towns of Silchar and Sylhet are now in possession of pipe water-supplies.

An expenditure of Rs. 2,660 was incurred by the Shillong Municipality in minor sanitary improvements, such as the construction of new public latrines, and of soakage pits in connection with them, and in the purchase of new trenching grounds. The improvement of the water-supply, and the conservancy of the Mawkhar area in which typhoid was formerly prevalent, along with the inoculation measures carried out by Dr. Roberts, has apparently proved successful in abolishing the disease in this area. As the result of my recommendations, improvement of the sanitation of the village of Malki was taken in hand.

Assam Valley Division.

No progress was made with the project for a pipe water-supply for the town of Dhubri, and it is as yet undecided what should be the source of supply, the opinion of the Sanitary Board in favour of the Brahmaputra as the source of supply being reconsidered at the instance of the Chief Engineer. Provision has been made in the current year's budget for extra grants to the Municipality necessitated by the inevitably increased cost of the scheme. A conservancy improvement scheme in the town of Goalpara is in progress, but the pipe water-supply scheme for the town is in abeyance for lack of funds. The construction of pucca surface drains in the Kayapotti quarter of the town of Gauhati made some progress. In Barpeta, a burning ghat was constructed by the Municipality, and a small pucca well in the town is in progress. No new works of general sanitary improvements were carried out during the year in the towns in the districts of Darrang, Nowgong, Sibsagar and Lakhimpur.

A total expenditure of Rs. 21,193 is reported to have been incurred by the Public Works Department on original works and repairs under the heads "improvement to towns," "drainage," "water-supply" and "miscellaneous improvements" in 1918 in the province as compared with Rs. 74,406 in the preceding year.

SECTION X.

GENERAL REMARKS.

32. The nineteen Local Boards in the province spent Rs. 88,456 on the improvement of water-supplies, and on other minor sanitary works during the year 1918, as compared with Rs. 2,08,868 spent in the preceding year. The large fall is due to the absence from their budgets of the Government 'grants-in-aid' to the 'five years' scheme for rural water-supplies improvement, and the expenditure for the year 1918 represents only the usual annual charges for maintenance of the existing works. Apart from the expenditure on *kala-azar*, which is a very special measure of rural sanitation, little or nothing has been available for this branch of work which has, however, received some thought and attention. A vernacular pamphlet was supplied to Local Boards for issue, in which some general instructions as regards the protection of water-supplies against pollution, the disposal of night-soil and refuse, the control of epidemics, maintenance of roads and general sanitation, were given. Proposals for the employment of a staff of rural health officers have been outlined and are now under the consideration of Government. The general idea of this scheme is that men of the Sub-Assistant Surgeon class, specially trained in public health, borne on a Government cadre, and paid by Government, should be posted to each Local Board, under whose authority they would work in the same way as urban sanitary inspectors work under Municipal Chairmen. It is believed by the writer that, if the interest of Local Boards were thus stimulated by the reports of their own health officers working largely under their own control, some small amount of money could even now be found from their slender resources for minor sanitary improvements, and that the foundations of corporate public health work in the future might thus be laid.

Village sanitation.

33. The following table shows the quantity of quinine sold, district by district during the year 1918, as compared with that in the year 1917 :—

Districts.	‘Treatment’ parcels sold in		Difference.	
	1918.	1917.	Increase.	Decrease.
1	2	3	4	5
	Rs.	Rs.	Rs.	Rs.
Cachar ...	1,142	1,373	...	232
Sylhet ...	5,626	10,292	...	4,666
Khasi and Jaintia Hills ...	1,381	2,142	...	761
Naga Hills ...	216	172	44	...
Lushai Hills ...	1,499	1,391	108	...
Goalpara ...	2,495	2,651	...	156
Kamrup ...	1,410	1,369	41	...
Darrang ...	583	829	...	246
Nowgong ...	889	969	...	80
Sibsagar ...	855	1,221	...	366
Lakhimpur ...	405	970	35	...
Garó Hills ...	37	122	...	85
Manipur State ...	322	227	95	...
North-East Frontier ...	20	...	20	...
Total ...	16,880	23,128	343	6,591
Total decrease ...	...	...	...	6,248

The decrease in the sale of quinine is largely due to the increase in price from three annas per treatment to four annas, and subsequently to six annas. This increase was rendered necessary by the war time prices of quinine in the open market, and to the rise in the sale price of similar treatments in Bengal. The decrease is very large in Sylhet, and the Civil Surgeon accounts for some of it by explaining that for August the sales were suspended on account of late receipt of supplies, and also on account of some misunderstanding regarding the price at which it was to be issued.

Pilgrim traffic.

34. There are no important gatherings of pilgrims in Assam on which comment is necessary.

35. Information in regard to six coolie camps has been supplied by the Chief Medical Officer, Assam-Bengal Railway, the average numbers present in these camps varied from 200 to 395

Railway coolie camps. the usual somewhat primitive arrangements as to water-supply and conservancy were in force, and the general health is reported to have been good. No construction camps are reported by the Eastern Bengal Railway.

36. The Laboratory continues to be useful. Despite the fact that during the year Assistant Surgeon Ram Taran Sen, L.M.S., the officer in charge, was also part-time Assistant Director of the Provincial Laboratory. Pasteur Institute, the number and examinations performed show an increase over those of previous years. The practical usefulness of the Laboratory is somewhat limited by the defective state of the law in regard to food prosecutions, which commonly fail unless an adulteration can be certified as injurious to health, and also, because the certificate of the officer in charge of the Laboratory is not accepted by the courts as having the force of the certificate of a chemical analyst.

To enable us to obtain samples of water for analysis from the various municipal water works, an itinerating sample taker was appointed in July 1918.

The vaccine lymph which is kept in cold storage in the Institute was the subject of repeated tests to ascertain the point at which sterility is attained by storage. It appears from these observations that no reasonable period of storage will ensure absolute sterility in all cases, but that the majority of lymphs have undergone a very material reduction in their bacterial content, amounting almost to practical sterility, after three months in cold storage, after which it is desirable that they should be issued for use if the potency is to be unimpaired.

During the last two months of the year the laboratory staff was also engaged in the preparation and despatch of influenza vaccine.

The subjoined table shows the amount of work done during the year 1918, as compared with 1917:—

	1917.	1918.
Chemical analysis of water	126	133
Chemical examination of ghee and fats	43	34
Examination of milk	50	34
Examination of mustard oil	27	29
Examination of other food-stuff	1	21
Bacteriological examination of water	87	208
Bacteriological examination of blood films	67	5
Bacteriological examination of splenic smears	13	7
Examination of vaccine lymph	190	375
Silts	258	55
Miscellaneous	...	1
Examination of mosquitoes	...	158

Emigration.

37. The number of labourers passing to Assam through Goalundo was small, being reported to be as follows:—

To the Brahmaputra Valley by steamers	9,676
To Cachar and Sylhet	5,813

From this number, 216 cases of infectious diseases were admitted to hospital at Goalundo, and 107 deaths occurred, of which 9 were due to cholera, and 98 to influenza. *Via* Naihati and Amingaon, 10,991 emigrants proceeded to the Assam Valley tea districts. In November and December, considerable mortality occurred *en route* from influenza, and to meet this, the emigration staff was strengthened, and extra clothing and medical comforts sanctioned for depôts on the river.

38. I held the post of Sanitary Commissioner throughout the year, which was a busy one, owing to the increase in the scope of the *kala-azar* operations, and on account of the work in connection with the medical and sanitary arrangements of the Assam Labour Corps returning from France.

In January, the municipalities of Silchar and Sylhet were inspected, district vaccination was tested in Sylhet and Cachar, and a conference of Provincial Sanitary Commissioners in Delhi was attended.

In February, the conditions in the *kala-azar*-infected areas in Mangaldai subdivision were investigated, the municipality of Barpeta inspected, and rural vaccination tested.

In March, Nowgong municipality was inspected, as also the *kala-azar* operations and vaccination in that district, a newly discovered *kala-azar* infection at Horu Kacharigaon in Golaghat was investigated, and Duria Tea Estate inspected. The municipality of Jorhat was inspected, as also the reported *kala-azar* infections in the Jorhat subdivision, and thereafter the *kala-azar* work in the Sibsagar subdivision was inspected.

In April, the municipality of Dibrugarh was inspected, and a visit paid to Pasighat to investigate an outbreak of malaria. I returned to headquarters on April 14th and commenced the preparation of the Sanitary Report.

In May, Gauhati was twice visited in connection with the return of labour corps.

In June, the Shillong municipality was inspected, and 3 visits paid to Gauhati to make arrangements for returning Labour Corps.

In July, two visits were paid to Gauhati for the same purpose, and a tour was commenced, extending into August, during which the municipalities of Tezpur, Dhubri and Goalpara were inspected.

In September and October, there was no touring, except for inspection of vaccination in the Khasi and Jaintia Hills.

In November and December, the *kala-azar*-infected areas in Golaghat, Jorhat and Sibsagar were visited, the *kala-azar* survey in Dibrugarh subdivision received a visit of supervision, and Gauhati and Barpeta Municipalities were inspected.

During the intervals of touring a report on the *kala-azar* operations was prepared, and the examination of material from Pasighat in pursuance of the anti-malarial work at that station was carried on.

T. C. McCOMBIE YOUNG, *Major, I.M.S.*,
Sanitary Commissioner, Assam.

SECTION XI.

ANNUAL REPORT OF THE SANITARY BOARD.

39. The Sanitary Board was reconstituted during the year as follows :—

The Inspector General of Civil Hospitals	...	...	President.
The Chief Engineer	...	...	Members.
The Commissioner of the Division concerned	...	...	
The Sanitary Commissioner	...	...	
The Hon'ble Rai Ghanasyam Barua Bahadur	...	...	
The Hon'ble Babu Radha Benode Das	...	...	Member and Secretary.
Mr. A. T. Duguid, Sanitary Engineer	...	...	

Only one formal meeting was held during the year, all other business being transacted by circulation of files and notes.

The only subjects of importance brought before the Board on which advice has been offered to Government are :—

(1) The Drainage of Dibrugarh.

(2) The source of the proposed water-supply to the town of Dhubri.

The Hon'ble Babu Radha Bonode Das resigned his membership on the 4th March 1919.

Rules have been framed and approved by Government for the inspection of water-works, and regulating the duties of the Secretary, Sanitary Board, and the Sanitary Engineer.

A. T. DUGUID,
Secretary,
Sanitary Board, Assam.

J. GARVIE,
President,
Sanitary Board, Assam.

STATEMENTS.

IMPERIAL STATEMENT No. I.—*Statement showing the births*

Number.	District.	Population according to the Census of 1911.			Number of births registered.		
		Male.	Female.	Total.	Male.	Female.	Total.
1	2	3	4	5	6	7	8
	SURMA VALLEY.						
1	Cachar ...	246,205	223,962	470,167	8,190	7,684	15,874
2	Sylhet ...	1,268,469	1,204,202	2,472,671	44,391	41,670	86,061
	Total ...	1,514,674	1,428,164	2,942,838	52,581	49,354	101,935
	ASSAM VALLEY.						
3	Goalpara ...	318,475	282,168	600,643	13,569	12,886	26,455
4	Kamrup ...	339,398	328,430	667,828	11,344	10,772	22,116
5	Darrang ...	198,581	178,733	377,314	7,082	6,888	13,970
6	Nowgong ...	154,938	148,658	303,596	5,367	5,190	10,557
7	Sibsagar ...	364,810	325,489	690,299	11,223	10,413	21,636
8	Lakhimpur ...	249,021	219,968	468,989	7,564	7,484	15,048
	Total ...	1,625,223	1,483,446	3,108,669	56,149	53,632	109,782
	Total for the Province ...	3,139,897	2,911,610	6,051,507	108,730	102,987	211,717

IMPERIAL STATEMENT No. II.—*Statement showing the births and deaths*

Number.	District.	Area, in square miles.	Average population per square mile.	Population (Census of 1911).			Births.		Number of deaths registered.		
				Male.	Female.	Total.	Total number.	Births per 1,000 of population.	Male.	Female.	Total.
1	2	3	4	5	6	7	8	9	10	11	12
	SURMA VALLEY.										
1	Cachar ...	1,859	253	246,205	223,962	470,167	15,874	33.76	10,981	10,327	21,308
2	Sylhet ...	5,388	458	1,268,469	1,204,202	2,472,671	86,061	34.80	52,162	46,234	98,396
	Total ...	7,247	406	1,514,674	1,428,164	2,942,838	101,935	34.64	63,143	56,561	119,704
	ASSAM VALLEY.										
3	Goalpara ...	3,954	151	318,475	282,168	600,643	26,455	44.04	17,477	14,363	31,840
4	Kamrup ...	3,858	173	339,398	328,430	667,828	22,116	33.11	17,379	16,516	33,895
5	Darrang ...	3,418	110	198,581	178,733	377,314	13,970	37.02	10,930	10,469	21,399
6	Nowgong ...	3,843	79	154,938	148,658	303,596	10,557	34.77	7,539	6,954	14,493
7	Sibsagar ...	4,996	138	364,810	325,489	690,299	21,636	31.34	16,111	15,318	31,429
8	Lakhimpur ...	4,529	103	249,021	219,968	468,989	15,048	32.08	13,414	12,860	26,274
	Total ...	24,598	126	1,625,223	1,483,446	3,108,669	109,782	35.31	82,850	76,480	159,330
	Total for the Province	31,845	190	3,139,897	2,911,610	6,051,507	211,717	34.98	145,993	133,041	279,034

registered in the districts of Assam during the year 1918.

Ratio of births per 1,000 of population.			Number of males born to every 100 females born.	Excess of births over deaths per 1,000 of population.	Excess of deaths over births per 1,000 of population.	Mean ratio of births per 1,000 during previous five years.		
Male.	Female.	Total.				Male.	Female.	Total.
9	10	11	12	13	14	15	16	17
17.41	16.34	33.76	103	...	11.56	15.99	15.18	31.18
17.95	16.85	34.80	106	...	4.99	16.32	15.04	31.37
17.86	16.77	34.64	106	...	6.03	16.27	15.06	31.34
22.59	21.45	44.04	105	...	8.96	20.35	19.15	39.51
16.98	16.12	33.11	105	...	17.64	16.09	15.05	31.14
18.76	18.25	37.02	102	...	19.69	18.14	17.54	35.68
17.67	17.09	34.77	103	...	12.96	16.46	15.61	32.08
16.25	15.08	31.34	107	...	14.13	16.40	15.37	31.78
16.12	15.95	32.08	101	...	23.94	14.90	13.97	28.87
18.06	17.25	35.31	104	...	15.94	17.09	16.11	33.20
17.96	17.01	34.98	105	...	11.12	16.69	15.60	32.29

registered in the districts of Assam during the year 1918.

Number of deaths of males to every 100 deaths of females.	Deaths per 1,000 of population from—											Mean ratio of deaths per 1,000 during the previous five years.		
	Cholera.	Small-pox.	Plague.	Fever.	Dysentery and Diarrhoea.	Respiratory diseases.	Injuries.	All other causes.	All causes.			Male.	Female.	Total.
									Male.	Female.	Total.			
13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
106	3.44	.49	.002	22.29	2.39	7.86	.27	8.74	44.60	46.11	45.32	24.36	24.76	24.55
112	3.67	.11	...	19.51	1.96	5.39	.38	8.75	41.12	38.39	39.79	27.69	25.85	26.79
111	3.64	.17	.0003	19.93	2.03	5.78	.36	8.75	41.68	39.60	40.67	27.15	25.68	26.44
121	2.43	.27	...	46.13	.30	2.27	.47	1.10	54.87	50.90	53.00	35.82	34.37	35.14
105	.97	1.65	.001	41.40	1.08	1.00	.26	4.36	51.20	50.28	50.75	26.95	24.52	25.75
104	1.58	.08	...	26.56	2.78	18.73	.40	6.55	55.04	58.57	56.71	34.73	36.03	35.35
108	.16	.05	...	33.11	1.39	8.87	.22	3.90	48.65	46.77	47.73	27.95	26.56	27.27
105	.71	.81	...	20.18	3.31	14.93	.18	5.37	44.16	47.06	45.52	25.84	26.50	26.15
104	.22	.14	...	23.16	4.05	20.66	.29	7.46	53.86	58.46	56.02	26.02	26.35	26.17
108	1.08	.62	.0003	32.24	2.11	10.22	.30	4.64	50.97	51.55	51.25	29.34	28.69	29.03
109	2.32	.40	.0003	26.25	2.07	8.06	.33	6.64	46.49	45.69	46.10	28.29	27.21	27.77

IMPERIAL STATEMENT No. III.—Deaths registered in the

No.	District.			January.	February.	March.	April.	May.
1	2			3	4	5	6	7
	SURMA VALLEY.							
1	Cachar	...	...	1,097	1,257	761	992	1,069
2	Sylhet	...	...	6,133	5,026	4,358	4,441	5,142
	Total	...	...	7,230	6,293	5,119	5,433	6,211
	ASSAM VALLEY.							
3	Goalpara	...	...	1,774	1,302	1,304	1,729	1,675
4	Kamrup	...	...	1,327	1,080	1,145	1,607	2,023
5	Darrang	...	...	880	798	798	716	1,044
6	Nowgong	...	...	499	537	541	551	596
7	Sibsagar	...	...	1,325	1,068	1,126	1,008	1,348
8	Lakhimpur	...	...	877	841	794	827	844
	Total	...	...	6,682	5,626	5,708	6,438	7,530
	Total for the Province	...	...	13,912	11,919	10,827	11,871	13,741
	Ratio per 1,000	...	...	2.29	1.96	1.78	1.96	2.27

IMPERIAL STATEMENT No. IV.—Deaths registered according to

No.	District.			Under 1 year.		1 and under 5.		5 and under 10.		10 and under 15.	
				Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.
1	2			3	4	5	6	7	8	9	10
	SURMA VALLEY.										
1	Cachar	...	...	1,801	1,491	1,511	1,498	932	852	568	466
2	Sylhet	...	...	10,015	8,083	7,196	6,965	4,316	3,325	2,500	1,752
	Total	...	...	11,816	9,574	8,707	8,463	5,248	4,677	3,068	2,218
	ASSAM VALLEY.										
3	Goalpara	...	...	3,548	3,036	2,427	2,225	1,558	1,211	915	806
4	Kamrup	...	...	2,986	2,909	3,144	3,209	2,084	1,896	1,221	855
5	Darrang	...	...	1,825	1,689	1,415	1,362	790	724	466	449
6	Nowgong	...	...	1,289	1,245	1,030	1,157	746	618	515	389
7	Sibsagar	...	...	1,858	1,572	2,282	2,215	1,287	1,228	853	779
8	Lakhimpur	...	...	1,275	1,311	1,707	1,818	1,009	998	674	631
	Total	...	...	12,781	11,762	12,005	11,986	7,474	6,675	4,644	3,909
	Total for the Province	...	...	24,597	21,336	20,712	20,449	12,722	11,352	7,712	6,127
	Population	...	...	106,330	106,901	356,689	374,837	491,403	482,110	333,555	264,628
	Ratio per 1,000	...	...	231.32	199.58	58.06	54.55	25.83	23.54	23.12	23.15

districts of Assam during each month of the year 1918.

June.	July.	August.	September.	October.	November.	December.	Total.
8	9	10	11	12	13	14	15
1,221	1,120	1,151	1,256	1,664	4,460	5,260	21,308
4,802	4,841	6,172	6,864	9,240	14,503	26,864	98,396
6,023	5,961	7,323	8,120	10,904	18,963	32,124	119,704
1,910	1,852	1,884	2,638	3,772	7,154	4,846	31,840
1,806	1,720	1,513	1,591	4,804	11,132	4,147	33,895
1,017	1,015	1,326	1,386	2,539	4,397	5,483	21,399
635	723	837	1,114	1,839	3,845	2,776	14,493
1,501	1,735	2,027	2,148	3,623	9,233	5,287	31,429
986	1,337	1,882	1,545	2,839	9,166	4,336	26,274
7,855	8,382	9,469	10,422	19,416	44,927	26,875	159,330
13,878	14,343	16,792	18,542	30,320	63,890	58,999	279,034
2.29	2.37	2.77	3.06	5.01	10.57	9.74	46.10

age in the districts of Assam during the year 1918.

15 and under 20.		20 and under 30.		30 and under 40.		40 and under 50.		50 and under 60.		60 and upwards.	
Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.
11	12	13	14	15	16	17	18	19	20	21	22
550	752	1,415	1,918	1,463	1,417	1,039	693	714	484	988	756
2,208	3,066	5,592	7,805	6,390	5,366	4,691	2,858	3,655	2,343	5,599	4,171
2,753	3,818	7,007	9,723	7,853	6,783	5,730	3,551	4,369	2,827	6,587	4,927
926	1,073	1,988	2,166	2,055	1,497	1,565	911	1,177	660	1,318	778
756	896	1,667	2,290	1,907	1,794	1,419	1,014	1,090	788	1,105	865
419	598	1,274	1,836	1,962	1,895	1,279	835	894	602	606	479
411	492	857	1,050	925	783	743	470	523	364	500	386
794	944	2,086	2,947	2,543	2,671	1,956	1,368	1,381	852	1,071	742
625	826	1,885	2,489	2,657	2,394	1,860	1,194	1,008	675	714	524
3,931	4,829	9,757	12,778	12,049	11,034	8,822	5,792	6,073	3,941	5,314	3,774
6,639	8,647	16,764	22,501	19,902	17,817	14,552	9,343	10,442	6,768	11,901	8,701
231,893	245,076	526,427	563,035	501,836	399,477	303,554	224,199	167,715	136,717	120,495	114,630
28.84	35.28	31.84	39.96	39.65	44.60	47.93	41.67	62.26	49.50	98.76	75.90

IMPERIAL STATEMENT No. V.—Deaths registered according

Number.	District.				Population according to Census of 1911.					
					Christians.	Hindus.	Muhammadans.	Buddhists.	Other classes.	Total.
1	2				3	4	5	6	7	8
SURMA VALLEY.										
1	Cachar	...	...	...	1,117	305,035	155,653	24	8,333	470,167
2	Sylhet	...	...	...	1,512	1,093,950	1,364,739	20	7,450	2,472,671
	Total				2,629	1,403,985	1,520,392	44	15,788	2,942,838
ASSAM VALLEY.										
3	Goalpara	...	...	...	5,252	334,720	211,562	955	48,154	600,643
4	Kamrup	...	...	...	2,535	459,227	64,627	574	140,865	667,828
5	Darrang	...	...	...	1,913	245,341	20,305	609	109,146	377,314
6	Nowgong	...	...	...	1,373	177,795	15,689	41	108,698	303,596
7	Sibsagar	...	...	...	5,410	595,266	29,718	1,964	57,941	690,299
8	Lakhimpur	...	...	...	4,789	367,990	13,419	5,648	77,143	438,989
	Total				21,272	2,180,339	355,320	9,791	541,947	3,108,669
	Total for the Province				23,901	3,584,324	1,875,712	9,835	557,735	6,051,507

IMPERIAL STATEMENT No. VI.—Deaths registered from different

Number.	Districts and towns.	Population according to Census of 1911.	Cholera.	Small-pox.	Plague.	Fever.	Dysentery and diarrhoea.	Respiratory diseases.	In-	
									Suicide.	
									Male.	Female.
1	2	3	4	5	6	7	8	9	10	11
	DISTRICTS EXCLUDING TOWNS.									
	SURMA VALLEY.									
1	Cachar	459,920	1,615	233	...	10,341	1,092	3,612	6	10
2	Sylhet	2,441,929	9,036	262	...	48,090	4,774	13,216	37	26
	Total	2,901,849	10,651	495	...	58,431	5,866	16,828	43	36
	ASSAM VALLEY.									
3	Goalpara	588,871	1,425	163	...	27,587	128	1,278	10	3
4	Kamrup	644,608	635	1,102	1	27,445	577	296	37	24
5	Darrang	371,305	595	33	...	9,994	1,041	7,021	18	11
6	Nowgong	298,163	48	18	...	10,015	381	2,630	4	2
7	Sibsagar	674,485	490	553	...	13,757	2,254	10,297	13	9
8	Lakhimpur	452,781	105	48	...	10,761	1,825	9,454	16	5
	Total	3,030,213	3,298	1,917	1	99,559	6,206	30,886	98	54
	Total for districts, excluding towns.	5,932,062	13,949	2,412	1	157,990	12,072	47,714	141	90

to class in the districts of Assam during the year 1918.

Number of deaths registered.						Ratio of deaths per 1,000 of population.					
Christians.	Hindus.	Muhammadans.	Buddhists.	Other classes.	Total.	Christians.	Hindus.	Muhammadans.	Buddhists.	Other classes.	Total.
9	10	11	12	13	14	15	16	17	18	19	20
18	12,210	7,597	...	1,433	21,308	16.11	40.02	43.80	...	177.86	45.32
15	37,737	58,932	1	1,661	98,396	9.92	34.38	43.18	50.66	222.95	39.79
33	49,997	66,529	1	3,144	119,704	12.55	35.61	43.75	22.72	199.13	40.67
507	14,811	11,679	19	4,824	31,840	96.53	44.44	55.20	19.89	100.17	53.09
36	22,840	4,224	3	6,792	33,895	14.20	49.73	65.35	5.22	48.21	50.75
131	11,438	1,108	25	8,697	21,399	68.47	46.62	54.66	41.05	79.68	56.71
33	8,374	1,550	2	4,534	14,493	24.03	47.09	68.79	48.78	41.71	47.73
159	25,006	887	57	5,320	31,429	29.39	42.00	29.84	29.02	91.81	45.52
124	20,187	610	326	5,027	26,274	25.89	54.85	45.45	57.71	65.16	56.02
990	102,656	20,053	432	35,194	159,330	46.54	47.08	56.45	44.12	64.93	51.25
1,023	152,653	86,587	433	38,333	279,934	42.80	42.58	46.16	41.02	63.73	46.10

causes in the districts and towns of Assam during the year 1918.

Injuries.				All other causes.	Total.	Ratio of deaths per 1,000 of population.										Number.
Wounds or accidents.	Snakes and wild animals.	Rabies.	Total.			Cholera.	Small-pox.	Plague.	Fever.	Dysentery and diarrhoea.	Respiratory diseases.	Injuries.	All other causes.	From all causes.		
														For the year.	Mean of previous five years.	
12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
102	7	...	125	4,017	21,035	3.51	.50	...	22.48	2.37	7.85	.27	8.73	45.73	24.69	1
791	66	...	920	21,321	97,619	3.70	.11	...	19.39	1.95	5.41	.37	8.73	39.97	23.84	2
893	73	...	1,045	25,338	118,654	3.67	.17	...	20.13	2.02	5.79	.36	8.73	40.88	26.50	
160	104	...	277	582	31,440	2.41	.27	...	46.84	.21	2.17	.47	.93	53.39	25.39	3
58	41	...	160	2,553	32,769	.98	1.70	.001	42.57	.89	.45	.24	3.96	50.83	25.75	4
59	56	...	144	2,399	21,227	1.60	.08	...	26.91	2.80	18.90	.38	6.46	57.16	35.38	5
33	24	...	63	1,133	14,238	.16	.06	...	33.58	1.27	8.82	.21	3.79	47.92	27.24	6
84	21	...	127	3,661	31,049	.72	.81	...	20.39	3.34	15.13	.18	5.42	46.03	26.25	7
93	18	...	132	3,333	25,653	.23	.10	...	23.76	4.03	20.87	.29	7.36	56.66	26.17	8
487	264	...	993	13,661	156,431	1.03	.63	.0003	32.85	2.04	10.19	.29	4.50	51.62	29.13	
1,380	357	...	1,948	38,999	275,035	2.35	.40	.0001	26.63	2.03	8.04	.32	6.57	46.37	27.84	

IMPERIAL STATEMENT No. VI.—Deaths registered from different causes

Number.	Districts and towns.	Population according to Census of 1911.	Cholera.	Small-pox.	Plague.	Fever.	Dysentery and diarrhoea.	Respiratory diseases.	In-	
									Snicide.	
									Male.	Female.
1	2	3	4	5	6	7	8	9	10	11
TOWNS.										
SURMA VALLEY.										
1	Silchar	8,785	4	1	1	36	32	82	...	...
2	Hailakandi	1,462	2	...	...	11	1	5	...	...
3	Sylhet	14,457	4	1	...	12	58	91	...	...
4	Karimganj	3,052	3	1	...	38	18	2	...	...
5	Maulvi Bazar	2,369	20	...	...	29	1	13	...	...
6	Habiganj	6,244	20	...	...	50	...	5	...	...
7	Sunamganj	4,620	6	1	...	46	12	7	...	...
	Total	40,989	59	4	1	222	122	205	...	...
ASSAM VALLEY.										
8	Dhubri	5,808	19	...	...	26	17	55	...	...
9	Goalpara	5,964	21	...	...	100	39	31	...	2
10	Gauhati	12,481	9	...	...	129	63	176	1	1
11	Barpeta	10,739	8	...	...	75	86	202	4	...
12	Tezpur	5,355	...	...	...	13	6	45	...	1
13	Mangaldai	654	3	...	...	16	5	2	1	...
14	Nowgong	5,473	1	...	...	39	41	65	...	1
15	Sibsagar	5,764	2	...	...	59	7	6	...	...
16	Nazira	2,583	1	...	...	45	6	...	...	...
17	Jorhat	5,231	1	...	...	41	15	65	...	...
18	Golaghat	2,236	3	10	...	33	3	30	...	...
19	Dibrugarh	14,563	1	21	...	34	72	171	...	...
20	North Lakhimpur	1,645	...	...	...	70	5	66	...	...
	Total	78,456	69	31	...	680	366	914	6	5
	Total of towns	119,445	128	35	1	902	488	1,119	6	5
	Total for the Province	6,051,507	14,077	2,447	2	158,892	12,560	48,833	147	95

in the districts and towns of Assam during the year 1918—concluded.

Injuries.				All other causes.	Total.	Ratio of deaths per 1,000 of population.											Number.
Wounds or accidents.	Snakes and wild animals.	Rabies.	Total.			Cholera.	Small-pox.	Plague.	Fever.	Dysentery and diarrhoea.	Respiratory diseases.	Injuries.	All other causes.	From all causes.			
														For the year.	Mean of previous five years.		
12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	
5	...	...	5	65	226	·45	·12	·12	4·09	3·64	9·33	·56	7·39	25·72	19·12	1	
...	...	...	...	28	47	1·36	...	...	7·52	·68	3·41	...	19·15	32·14	21·62	2	
12	...	...	12	182	360	·27	·06	...	·83	4·01	6·29	·83	12·58	24·90	26·49	3	
1	...	...	1	17	80	·98	·32	...	12·45	5·89	·66	·32	5·57	26·21	21·62	4	
...	...	...	...	1	64	8·44	...	...	12·24	·42	5·48	...	·42	27·01	21·95	5	
6	...	...	6	57	138	3·20	...	...	8·01	...	·80	·96	9·12	22·10	19·38	6	
1	1	...	2	61	135	1·29	·21	...	9·95	2·59	1·51	·43	13·20	29·22	18·61	7	
25	1	..	26	411	1,050	1·44	·09	·02	5·41	2·97	5·00	·63	10·02	25·61	21·78		
3	1	..	4	43	164	3·27	...	...	4·47	2·92	9·46	·68	7·40	28·23	21·17	8	
4	1	...	7	38	236	3·52	...	...	16·76	6·53	5·19	1·17	6·37	39·55	23·47	9	
6	...	...	8	136	521	·72	...	...	10·33	5·04	14·10	·64	10·89	41·74	19·62	10	
3	...	...	7	227	605	·74	...	...	6·98	8·00	18·80	·65	21·13	56·33	32·96	11	
...	...	...	1	66	131	...	...	...	2·42	1·12	8·40	·18	12·32	24·46	30·43	12	
4	1	...	6	9	41	4·58	...	...	24·46	7·64	3·05	9·17	13·76	62·69	55·04	13	
5	...	...	6	53	205	·18	...	...	7·17	7·54	11·96	1·10	9·75	37·73	29·08	14	
...	...	...	...	18	92	·34	...	...	10·23	1·21	1·04	...	3·12	15·96	18·56	15	
2	...	...	2	...	54	·37	...	...	17·42	2·32	...	·77	...	20·90	15·87	16	
...	...	...	...	22	144	·19	...	...	7·83	2·86	12·42	...	4·20	27·52	25·42	17	
...	...	...	...	11	90	1·34	4·47	...	14·75	1·34	13·41	...	4·91	40·25	28·62	18	
5	...	...	5	154	459	·06	1·44	...	2·33	5·01	11·74	·34	10·57	31·51	25·61	19	
1	...	...	1	15	157	...	...	...	42·55	3·01	40·12	·60	9·11	95·44	31·61	20	
33	3	...	47	792	2,899	·88	·39	...	8·66	4·66	11·65	·59	10·09	36·95	25·35		
58	4	...	73	1,203	3,949	1·07	·29	·008	7·55	4·09	9·36	·61	10·07	33·06	24·12		
1,438	341	...	2,021	40,202	279,034	2·32	·40	·0003	26·25	2·07	8·06	·33	6·64	46·10	27·77		

IMPERIAL STATEMENT No. VII.—Deaths registered from Cholera in the

Number.	District	Circles of Registration.		Villages.		January.	February.	March.	April.	May.
		Number in each district.	Number from which deaths from cholera were reported.	Number in each district.	Number from which deaths from cholera were reported.					
1	2	3	4	5	6	7	8	9	10	11
	SURMA VALLEY.									
1	Cachar	8	7	1,103	145	2	1	12	22	20
2	Sylhet	23	23	10,781	2,439	43	73	169	234	343
	Total	31	30	11,884	2,584	45	74	181	256	363
	ASSAM VALLEY.									
3	Goalpara	21	16	2,137	171	...	...	1	11	32
4	Kamrup	15	13	1,954	96	11	7	31	93	163
5	Darrang	12	10	1,406	99	40	11	24	42	83
6	Nowgong	10	7	1,495	19*	1	...	7	3	3
7	Sibsagar	15	13	2,143	76	7	3	15	15	96
8	Lakhimpur	13	4	1,702	28	4	1	2	8	15
	Total	86	63	10,837	489	63	22	80	172	392
	Total for the Province	117	93	22,721	3,073	108	96	261	428	755

* Mauzas.

IMPERIAL STATEMENT No. VIII.—Deaths registered from

Number.	District.	Circles of Registration.		Villages.		January.	February.	March.	April.	May.	June.	July.
		Number in each district.	Number from which deaths from small-pox were reported.	Number in each district.	Number from which deaths from small-pox were reported.							
1	2	3	4	5	6	7	8	9	10	11	12	13
	SURMA VALLEY											
1	Cachar	8	5	1,103	79	24	50	37	36	42	13	18
2	Sylhet	23	18	10,781	86	14	16	24	20	52	45	17
	Total	31	23	11,884	165	38	66	61	56	94	58	35
	ASSAM VALLEY.											
3	Goalpara	21	10	2,137	46	8	8	20	13	17	19	32
4	Kamrup	15	11	1,954	206	52	77	176	230	234	135	64
5	Darrang	12	5	1,406	3	12	...	...	...	1	10	6
6	Nowgong	10	3	1,495	5*	...	...	...	...	1	8	...
7	Sibsagar	15	10	2,143	39	60	66	60	66	80	38	76
8	Lakhimpur	13	5	1,702	14	8	14	11	6	9	3	8
	Total	86	44	10,837	313	140	165	267	315	342	213	186
	Total for the Province	117	67	22,721	478	178	231	328	371	436	271	221

* Mauzas.

districts of Assam during each month of the year 1918.

June.	July.	August.	September.	October.	November.	December.	Total.			Ratio of deaths per 1,000 of population.			Mean ratio per 1,000 of previous five years.	Number.
							Male.	Female.	Total.	Male.	Female.	Total.		
12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
49	29	36	55	120	573	702	919	702	1,621	3.73	3.13	3.44	1.69	1
184	97	74	131	1,050	3,059	3,632	4,773	4,316	9,089	3.76	3.58	3.67	2.24	2
233	126	110	186	1,170	3,632	4,334	5,692	5,018	10,710	3.75	3.51	3.64	2.15	
20	7	2	82	202	431	677	751	714	1,465	2.35	2.53	2.43	2.55	3
19	32	14	28	15	96	143	358	294	652	1.05	.89	.97	4.03	4
48	32	22	9	26	93	168	313	285	598	1.58	1.59	1.58	3.25	5
6	2	3	12	6	5	1	25	24	49	.16	.16	.16	4.75	6
108	65	46	45	55	31	111	264	233	497	.72	.71	.71	2.35	7
15	8	13	3	29	4	4	57	49	106	.22	.22	.22	1.00	8
216	146	100	179	333	660	1,004	1,768	1,599	3,367	1.08	1.07	1.08	2.89	
449	272	210	365	1,503	4,292	5,338	7,460	6,617	14,077	2.37	2.27	2.32	2.53	

Small-pox in the districts of Assam during each month of the year 1918.

August.	September.	October.	November.	December.	Total.			Number of deaths among children.		Ratio of deaths per 1,000 of population.			Mean ratio per 1,000 of previous five years.	Number.
					Male.	Female.	Total.	Under 1 year.	One to 10 years.	Male.	Female.	Total.		
14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
4	4	...	2	4	129	105	234	54	62	.52	.46	.49	.57	1
15	11	10	10	31	170	95	265	22	59	.13	.07	.11	.29	2
19	15	10	12	35	299	200	499	76	121	.19	.14	.17	.33	
15	1	9	5	16	90	73	163	16	44	.28	.25	.27	.81	3
77	7	...	39	11	557	545	1,102	229	561	1.64	1.65	1.65	1.54	4
...	...	4	...	...	22	11	33	20	12	.11	.06	.08	.50	5
1	6	...	2	-	11	7	18	3	9	.07	.04	.05	.26	6
17	8	16	34	42	313	250	563	46	66	.85	.76	.81	.77	7
2	1	1	1	5	46	23	69	6	11	.18	.10	.14	.11	8
112	23	30	81	74	1,039	909	1,948	320	703	.64	.61	.62	.76	
131	38	40	93	109	1,338	1,109	2,447	396	824	.42	.38	.40	.55	

IMPERIAL STATEMENT No. IX.—Deaths registered from Fevers

Number.	District.				Circles of Registration.		Villages.						
					Number in each district.	Number from which deaths from fevers were reported.	Number in each district.	Number from which deaths from fevers were reported.					
1	2				3	4	5	6	7	8	9	10	11
SURMA VALLEY.													
1	Cachar	...	...	...	8	8	1,103	417	575	530	365	482	547
2	Sylhet	...	...	...	23	23	10,781	7,902	3,355	2,702	2,301	2,349	2,834
	Total	...	...	...	31	31	11,884	8,319	3,930	3,232	2,666	2,831	3,381
ASSAM VALLEY.													
3	Goalpara	...	...	...	21	21	2,137	2,050	1,678	1,235	1,204	1,583	1,507
4	Kamrup	...	...	...	15	15	1,954	1,365	1,023	814	738	1,002	1,295
5	Darrang	...	...	...	12	12	1,406	1,146	500	487	483	403	590
6	Nowgong	...	...	...	10	10	1,495	556	336	398	419	426	446
7	Sibsagar	...	...	...	15	15	2,143	2,137	668	552	601	510	650
8	Lakhimpur	...	...	...	13	13	1,702	1,521	379	353	330	333	341
	Total	...	...	...	86	86	10,837	8,274	4,584	3,839	3,775	4,257	4,829
	Total for the Province	...	...	...	117	117	22,721	16,593	8,514	7,071	6,441	7,088	8,210

* Mauzas.

IMPERIAL STATEMENT No. X.—Deaths registered from

Number.	District.			Circles of Registration.		Villages.		January.	February.	March.	April.	May.
				Number in each district.	Number from which deaths from dysentery and diarrhoea were reported.	Number in each district.	Number from which deaths from dysentery and diarrhoea were reported.					
1	2			3	4	5	6	7	8	9	10	11
	SURMA VALLEY.											
1	Cachar	...	...	8	7	1,107	147	79	91	53	102	110
2	Sylhet	...	...	23	21	10,781	2,709	311	208	210	216	347
	Total			31	28	11,884	2,856	390	299	263	318	457
	ASSAM VALLEY.											
3	Goalpara	...	...	21	16	2,137	80	10	6	6	17	31
4	Kamrup	...	...	15	14	1,954	195	37	30	47	58	77
5	Darrang	...	...	12	11	1,406	285	63	45	57	82	120
6	Nowgong	...	...	10	9	1,495	34*	33	19	22	31	50
7	Sibsagar	...	...	15	14	2,143	1,130	118	98	128	124	181
8	Lakhimpur	...	...	13	12	1,702	376	77	85	76	147	189
	Total			86	76	10,837	2,108	338	283	326	459	648
	Total for the Province...			117	104	22,721	4,964	728	582	599	777	1,105

* Mauzas.

in the districts of Assam during each month of the year 1918.

June.	July.	August.	September.	October.	November.	December.	Total.			Total ratio of deaths per 1,000 of population.			Mean ratio per 1,000 of previous five years.	Number.
							Male.	Female.	Total.	Male.	Female.	Total.		
12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
713	655	642	622	868	2,632	1,757	5,364	5,024	10,388	21.79	22.43	22.09	12.01	1
2,854	3,028	4,261	4,622	4,997	7,127	7,835	26,315	21,950	48,265	20.74	18.22	19.51	12.68	2
3,567	3,683	4,903	5,244	5,865	9,759	9,592	31,679	26,974	58,653	20.91	18.88	19.93	12.58	
1,751	1,678	1,754	2,436	3,422	6,537	2,928	15,271	12,442	27,713	47.95	44.09	46.13	29.35	3
1,230	1,249	1,046	1,146	4,375	10,026	3,705	14,099	13,550	27,649	41.54	41.25	41.40	15.32	4
623	602	649	755	1,842	3,024	65	5,205	4,818	10,023	26.21	26.95	26.56	19.16	5
493	575	669	874	1,614	3,196	608	5,221	4,833	10,054	33.69	32.51	33.11	16.29	6
777	953	965	1,007	1,851	3,789	1,612	7,396	6,539	13,935	20.27	20.08	20.18	12.32	7
451	626	771	716	1,437	3,269	1,859	5,526	5,339	10,865	22.19	24.27	23.16	11.47	8
5,325	5,683	5,854	6,934	14,541	29,841	10,777	52,718	47,521	100,239	32.43	32.03	32.24	17.34	
8,892	9,366	10,757	12,178	20,406	39,600	20,369	84,397	74,495	158,892	26.87	25.58	26.25	15.03	

Dysentery and Diarrhœa in the districts of Assam during each month of the year 1918.

June.	July.	August.	September.	October.	November.	December.	Total.			Total ratio of deaths per 1,000 of population.			Mean ratio per 1,000 of previous five years.	Number.
							Male.	Female.	Total.	Male.	Female.	Total.		
12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
104	76	76	89	81	104	160	597	528	1,125	2.42	2.35	2.39	2.28	
304	265	258	287	706	845	906	2,703	2,160	4,863	2.13	1.79	1.96	2.22	3
408	341	334	376	787	949	1,066	3,300	2,688	5,988	2.17	1.88	2.03	2.23	
41	16	13	16	13	7	8	119	65	184	.37	.23	.30	.37	4
165	67	71	57	47	35	35	410	316	726	1.20	.96	1.08	.93	5
216	88	109	112	123	87	50	546	506	1,052	2.75	2.83	2.78	4.03	6
49	48	40	39	43	26	22	239	183	422	1.54	1.23	1.39	1.71	7
252	262	289	288	280	152	113	1,220	1,065	2,285	3.34	3.27	3.31	4.38	8
266	236	210	203	183	138	93	1,039	864	1,903	4.17	3.92	4.05	4.56	
889	717	732	715	689	445	221	3,573	2,999	6,572	2.19	2.02	2.11	2.59	
1,297	1,058	1,066	1,091	1,476	1,394	1,387	6,873	5,687	12,560	2.18	1.95	2.07	2.41	

IMPERIAL STATEMENT No. XI.—Deaths registered from

Number	District.	Circles of Registration.		Villages.		January.	February.	March.	April.	May.
		Number in each district.	Number from which deaths from respiratory diseases were reported.	Number in each district.	Number from which deaths from respiratory diseases were reported.					
1	2	3	4	5	6	7	8	9	10	11
	SURMA VALLEY.									
1	Cachar ...	8	8	1,103	92	76	128	51	43	67
2	Sylhet ...	23	20	10,781	1,033	221	203	168	141	150
	Total ...	31	28	11,884	1,125	297	331	219	184	217
	ASSAM VALLEY.									
3	Goalpara ...	21	18	2,137	76	13	11	12	5	6
4	Kamrup ...	15	14	1,954	94	21	20	13	24	30
5	Darrang ...	12	11	1,406	721	73	69	66	40	49
6	Nowgong ...	10	10	1,495	54	11	15	16	5	6
7	Sibsagar ...	15	13	2,143	355	116	94	88	74	56
8	Lakhimpur ...	13	12	1,702	300	105	116	109	105	70
	Total ...	86	78	10,837	1,609	339	325	304	253	217
	Total for the Province ...	117	106	22,721	2,734	636	656	523	437	434

IMPERIAL STATEMENT No. XII.—Deaths registered from Plague

Number.	District.	Circles of Registration.		Villages.		January.	February.	March.	April.	May.
		Number in each district.	Number from which deaths from plague were reported.	Number in each district.	Number from which deaths from plague were reported.					
1	2	3	4	5	6	7	8	9	10	11
	SURMA VALLEY.									
1	Cachar ...	8	1	1,103	1	...	...	...	1	...
2	Sylhet ...	23	...	10,781	...	...	...	...	...	...
	Total ...	31	1	11,884	1	...	...	...	1	...
	ASSAM VALLEY.									
3	Goalpara ...	21	...	2,137	...	...	...	...	...	...
4	Kamrup ...	15	1	1,954	1	...	...	...	1	...
5	Darrang ...	12	...	1,406	...	...	...	...	...	...
6	Nowgong...	10	...	1,495	...	...	...	...	...	...
7	Sibsagar ...	15	...	2,143	...	...	...	...	...	...
8	Lakhimpur ...	13	...	1,702	...	...	...	...	...	...
	Total ...	86	1	10,837	1	...	...	...	1	...
	Total for the Province ...	117	2	22,721	2	...	...	...	2	...

Respiratory diseases in the districts of Assam during each month of the year 1918.

Juno.	July.	August.	September.	October.	November.	December.	Total.			Total ratio of deaths per 1,000 of population.			Mean ratio per 1,000 of previous five years.	Number.
							Male.	Female.	Total.	Male.	Female.	Total.		
12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
72	75	96	149	225	641	2,076	1,906	1,793	3,699	7.74	8.00	7.86	.84	1
122	135	216	209	229	545	10,995	6,858	6,476	13,334	5.40	5.37	5.39	.67	2
194	210	312	358	454	1,186	13,071	8,764	8,269	17,033	5.79	5.72	5.78	.70	
5	15	16	16	16	90	1,159	710	654	1,364	2.22	2.31	2.27	.13	3
17	20	24	39	61	348	57	375	299	674	1.10	.91	1.00	.29	4
42	78	272	303	237	950	4,889	3,659	3,409	7,068	18.38	19.07	18.73	1.44	5
8	10	24	45	30	403	2,032	1,422	1,273	2,695	9.17	8.56	8.87	.27	6
67	83	359	305	1,045	4,788	3,233	5,191	5,117	10,308	14.22	15.72	14.93	1.05	7
57	147	459	190	919	5,349	2,065	5,966	4,625	9,691	20.34	21.02	20.66	2.12	8
196	353	1,154	898	2,308	12,018	13,435	16,423	15,377	31,800	10.10	10.36	10.22	.84	
390	563	1,466	1,256	2,762	13,204	26,506	25,187	23,646	48,833	8.02	8.12	8.06	.77	

in the districts of Assam during each month of the year 1918.

Juno.	July.	August.	September.	October.	November.	December.	Total.			Total ratio of deaths per 1,000 of population.			Mean ratio per 1,000 of previous five years.	Number.
							Male.	Female.	Total.	Male.	Female.	Total.		
12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
...	...	...	...	...	...	...	...	1	1	...	.004	.002	...	1
...	...	...	...	...	...	...	...	...	...	...	...	...	...	2
...	...	...	...	...	...	...	...	1	1	...	.0007	.0003	...	
...	...	...	...	...	...	...	...	...	...	...	...	...	...	3
...	...	...	...	...	...	...	1	...	1	.002	...	.001	...	4
...	...	...	...	...	...	...	...	...	...	...	...	...	...	5
...	...	...	...	...	...	...	...	...	...	...	...	...	...	6
...	...	...	...	...	...	...	...	...	...	...	...	...	...	7
...	...	...	...	...	...	...	...	...	...	...	...	...	...	8
...	...	...	...	...	...	...	1	...	1	.0006	...	.0003	...	
...	...	...	...	...	...	...	1	1	2	.0003	.0.03	.0003	...	

APPENDIX II.

PROVINCIAL.

Statement showing details of registration in compulsory areas.

Compulsory registration area.	Population according to Census of 1911.	Estimated births at 286 per 1,000 married women between the ages of 15 and 40.	Number of births registered during the year.	Estimated birth-rate per mille.	Registered birth-rate per mille.	Number of deaths registered during the year.		Death-rate per mille.		Number of prosecutions under Act IV (B.C.) of 1873.	Number of convictions.
						Including deaths in hos-pitals.	Excluding deaths in hos-pitals.	Including deaths in hos-pitals.	Excluding deaths in hos-pitals.		
1	2	3	4	5	6	7	8	9	10	11	12
Silchar	8,785	296	246	33·69	28·00	226	178	25·72	20·26	7	7
Hailakandi	1,462	45	48	30·78	32·83	47	31	32·14	21·20	6	6
Sylhet	14,457	582	477	40·26	32·99	360	330	24·90	22·82	12	8
Karimganj	3,052	260	96	39·92	31·45	80	67	26·21	21·95	6	6
Maulvi Bazar	2,369	77	66	32·50	27·85	64	53	27·01	23·37	15	13
Habiganj	6,244	222	188	35·55	30·10	138	129	22·10	20·65	6	5
Sunamganj	4,620	145	156	31·38	33·76	135	129	29·22	27·92	21	16
Dhubri	5,808	191	193	32·83	34·09	164	119	28·23	20·48	8	6
Goalpara	5,964	197	212	33·03	35·54	236	211	39·55	35·37	6	1
Ganhati	12,481	409	473	32·77	37·89	521	378	41·74	30·20	75	57
Barpeta	10,739	482	565	44·88	52·61	605	600	56·33	55·87	22	18
Tezpur	5,355	167	209	31·18	39·02	131	82	24·46	15·31	7	6
Mangaldai	654	*	15	*	22·93	41	30	62·69	45·87	9	6
Nowgong	5,433	185	185	34·05	34·05	205	163	37·73	30·00	25	21
Sibsagar	5,764	213	120	36·95	20·81	92	60	15·96	10·40	4	3
Nazira	2,583	•	68	*	26·32	54	54	20·90	20·90	8	6
Jorhat	5,231	192	214	36·70	40·90	144	111	27·52	21·21	17	15
Golaghat	2,236	88	60	39·35	26·83	99	69	40·25	30·85	6	5
Dibrugarh	14,563	543	331	37·28	22·72	459	262	31·51	17·99	57	16
North Lakhimpur...	1,645	*	52	*	31·61	157	144	95·44	87·30	...	...
Total	119,445	4,294	3,979	34·96	33·31	3,949	3,200	33·06	26·79	336	234

* Not available.

Resolution on the Annual Sanitary Report of the Province of Assam for the year 1918.

*Extract from the Proceedings of the Chief Commissioner of Assam in the Municipal
Department, No. 3483M., dated the 25th June 1919.*

READ —

The Sanitary Report for the year 1918.

R E S O L U T I O N .

1. The provincial birth-rate for the year 1918 was above the average and above that of the preceding year. This would seem to indicate that general conditions were not unfavourable to health. Assam, however, did not escape the general epidemic of influenza. Its first appearance, in July, was in a mild form. In October, there was a virulent attack, throughout most of the province. This was at its height during November, but subsided to a considerable extent by the end of December.

The recorded provincial death-rate rose from 27·09 per mille for the year 1917 and 27·36 for the preceding quinquennium to no less a figure than 46·10.

The Sanitary Commissioner estimates that the mortality, from influenza, on the total population was 17·04. This is, however, admittedly below the mark, for in the Hill Districts, where mortality is known to have been high, registration is necessarily defective. Though Assam was less unfortunate than most provinces in India, it would seem that the disease, within four months, took toll of a hundred thousand lives.

Among other measures taken to combat this epidemic was the wide distribution of medicines and of leaflets of advice. Segregation was tried in certain cases where this was practicable.

Captain Knowles, I.M.S., Director of the Pasteur Institute, Shillong, prepared and issued in large quantities a vaccine designed to immunise the patient against pulmonary complications. Its popularity, especially on tea estates, goes to show that it was effective. It is understood that the results obtained will be stated and examined in a separate report.

The Chief Commissioner has read with much interest the Sanitary Commissioner's suggestions for dealing with local recrudescences of the epidemic and commends them to the notice of District and Medical Officers. He desires to record his special appreciation of the efforts of Captain Knowles and others who devoted their energies to stemming the disease.

2. While provincial figures indicate that the disease of *kala-azar* is being kept well in hand, the Chief Commissioner cannot but regard with concern its tendency to spread in the Garo Hills.

The campaign against *kala-azar* continues to be prosecuted vigorously. A detailed survey of the areas affected or likely to be affected was undertaken and the result published in a supplement to last year's Sanitary Report. The operations undertaken in Sibsagar have given promising results and it is expected that the *kala-azar* hospital in that district will be opened shortly.

3. There were three cases of pneumonic plague in April 1918, all of which were imported. Two ended fatally. Successful precautions were taken to prevent the spread of the disease.

4. The figures of mortality from fevers and respiratory diseases were much above the normal. Cholera is reported to have been more prevalent than usual in the Surma Valley and less prevalent in the Assam Valley. There is no doubt that many deaths due to influenza were attributed to fevers and respiratory diseases, while it is possible that some cases of influenza of a gastro-intestinal type were entered as cholera.

There was no serious outbreak of small-pox. In Kamrup, where a section of the population is strongly opposed to vaccination, the continued mortality was high. The Chief Commissioner trusts that the efforts of the Deputy Commissioner and the medical staff will ultimately effect real improvement.

Proposals submitted by the Sanitary Commissioner for strengthening the staff of vaccinators have recently been approved. These proposals have been laid before Local Boards with the recommendation that, as far as possible, they should now be introduced.

Sir Nicholas Beatson Bell fully realises that the health of labourers on tea estates is a matter of the most anxious concern to the industry. He feels sure that employers will continue to do what lies in their power to reduce mortality from dysentery, diarrhoea and other causes which may be preventable.

The reported decrease in the sale of quinine is to be regretted. It is hoped that it is temporary.

5. The Chief Commissioner observes with satisfaction that increased attention has been paid by the vaccination staff to the work of inspecting village registers of vital statistics. Inquiry will be made as regards the notably defective registration in the Palasbari Circle of the Kamrup district.

6. Owing to lack of funds, various schemes with regard to sanitation and water-supply both in rural and town areas had to remain in abeyance. The Chief Commissioner regrets that he was unable in 1918-19 to make grants to Local Boards in aid of the five years' programme for the improvement of water-supply. These grants have since been renewed.

Among minor schemes which were taken up were those of improving the water-supply and conservancy in the Maukhar area of the Shillong Municipality and conservancy in the town of Goalpara.

At Pasighat, Haflong and Lumding an anti-malarial campaign was in progress.

The Sanitary Commissioner's proposals for a staff of rural health officers are now under consideration.

7. Towards the end of the year there was heavy mortality, chiefly from influenza, among emigrants on their way to the Assam Valley. Endeavours were made to cope with this, by the strengthening of the emigration staff and the provision of extra clothes and comforts at depôts.

8. Sir Nicholas Beatson Bell again thanks Major Young for his successful administration of the Department. He is also grateful for the help given by the President and Members of the Sanitary Board.

ORDERED that the Resolution and the Report be published in the *Assam Gazette*.

By order of the Chief Commissioner of Assam,

A. R. EDWARDS,

Offg. Second Secretary to the Chief Commissioner of Assam.

